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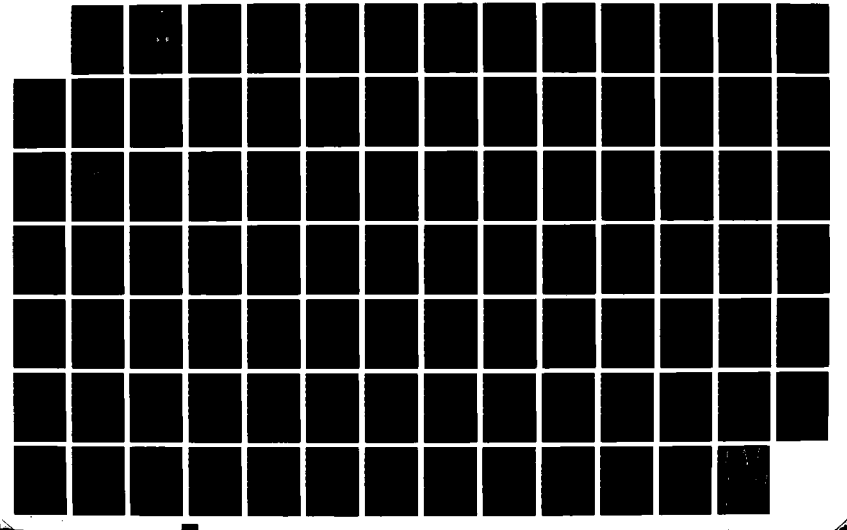

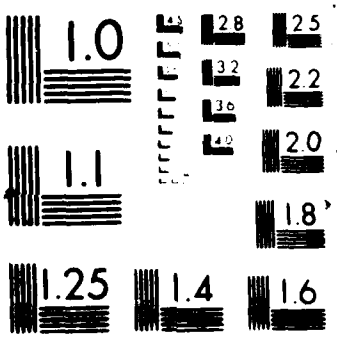
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Chicago's O'Hare Runway Configuration Management System (RCMS) Volume I - Description of the Operational Software

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July 1987

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EXECUTIVE SUMMARY

The operational software for the Chicago O'Hare Runway Configuration Management System (RCMS), described in Volume I, was prepared in response to operational requirements expressed by both facility and regional personnel from the Federal Aviation Administration (FAA) Great Lakes Region.

The software was developed for the three modes of operation -- the current mode, the planning mode, and the forecast mode. Each mode was designed to perform certain functions for an RCMS user.

The current mode is intended to be responsive to the existing airport conditions and the changes which may occur within a short period of time (for example, an equipment failure). The software examines configuration eligibility after any significant change in runway or equipment status to determine the impact on the current situation. The user is informed of this status through a screen of data which is refreshed without an operator's intervention.

The planning mode provides the user with the capability to plan equipment, runway, and weather changes throughout the facility day. It operates in concert with the current mode and forecast mode to prohibit undesirable reactions to current and future selected configurations.

The forecast mode offers an unrestrained examination of both configuration selection and plans. It enables the user to resolve conflicts before submitting the data to the current mode of operation.

This software was the starting point for the operational evaluation of the RCMS at the Chicago O'Hare Airport.

Volume II of this report, the user's guide, is organized by computer terminal operation, modes of operation, and external inputs (supporting programs) to RCMS.

1. INTRODUCTION.

1.1 PURPOSE.

This report describes the proposed Runway Configuration Management System (RCMS) operational software to undergo test and evaluation at the Chicago O'Hare Federal Aviation Administration (FAA) Tower Facility (ORD). It will also serve as an input to RCMS functional specifications for the Traffic Management System (TMS) program.

1.2 BACKGROUND.

RCMS is a planning tool for Chicago O'Hare International Airport. Using interactive computer logic, RCMS helps supervisors select runway configurations which reduce aircraft delays by optimizing throughput capacity in dynamic operational environments.

The formation of the O'Hare Delay Task Force, to identify the causes of and the potential solutions to air traffic delays at Chicago, provided the impetus for this system. MITRE Corporation conducted the initial RCMS effort as described in Federal Aviation Administration Report No. FAA-EM-82028 (Volumes I and II), dated October 1982. AEM-100 requested the FAA Technical Center to purchase a computer and to set up the system for evaluation by the Chicago O'Hare personnel. Later, the effort was expanded to make the system operationally acceptable to the facility personnel.

2. DISCUSSION.

2.1 RCMS DESCRIPTION.

RCMS incorporates both the operational requirements and improvements to three interconnected PL/1 software application programs developed by the MITRE corporation. The following describes the computer, the hardware, the software, and the data bases which comprise RCMS.

Computer and Hardware Equipment. RCMS consists of an IBM 4321 processor and the support equipment shown in figure 1. The computer runs under the Virtual Machine/Special Product (VM/SP) Operating System which is a user-oriented, time-sharing processor. Details of the final computer configuration will be documented when the system is installed at the facility. The computer hardware and the associated licensed software are maintained under contract with IBM.

Software Programs. The RCMS software is comprised of three different types of application programs: a background program, a foreground program, and several supporting programs.

The background software runs independently, that is, without a terminal operator or a user. As the executive program of RCMS, it interfaces with the other programs through the data bases.

The foreground program consists of user-oriented software which generates two types of screen data for facility personnel -- the write full screen (WFS) data and the static panel data. The WFS is refreshed every 2 minutes or is updated when a significant event occurs or when a panel changes. Users may alter the fixed panels but not the WFS panel.

Data Bases. The master data base, the WFS data base, the personal computer (PC) data base, and the forecast mode data base enable the software programs and the users to exchange data and to transfer results. Their contents are described in appendix A, RCMS Library.

The master data base is the main channel of communication for RCMS. It contains the updated information required by each program for the current and planning modes of operation. Protocol messages control the exchange of data. The background and foreground programs attach to and detach from this data base during their read and write functions. When accessing the master data base, each program assumes the responsibility of resolving the data.

The WFS data base is a one-way channel from the background program to a user program. It contains the screen data and the messages for the user viewing the Master Auto Panel (PF-1). There are three types of messages -- alerts, advisories, and ordinary -- which the user may display one at a time. Alerts and advisories are indicated via a ringing bell and/or the highlighting of screen data.

The PC data base provides the equipment status and readings to the background program through the master data base. The PC User program automatically updates the PC data base and resolves the master data base.

The forecast mode data base is very similar to the master data base. It is independent of all other data bases and provides a user the opportunity to exercise WHAT IF conditions in the forecast mode. Configurations, weather

conditions, and equipment outages can be planned for an entire day rather than an immediate look-ahead time. The entire day's demand data is available through a DEMAND file generated by a supporting program. Portions of the forecast mode data base -- selected configurations and revised planning logs -- can be inserted into the master data base for use in the current mode. The background program processes the data as user input and performs its normal functions to establish current conditions, determine configuration eligibility, and resolve the master data base.

Figures 2 and 3 show the relationship of the data bases to the software programs and to the modes of operation.

2.2 BACKGROUND PROGRAM OPERATION.

The current background program controls the flow of data among all users, determines configuration eligibility, generates messages for the users, and either accepts or rejects a plan submitted by a user. The following sections describe the operation of the current background program for the current and planning modes. There is a separate background program for the forecast mode, called the forecast background program; its special features enable the user to exercise WHAT IF conditions.

2.2.1 Auto Startup and Restart.

The background program is designed to run without the intervention of a user. It is initialized by the computer operator and then placed in a wake-up mode. If the program does stop for some reason, a restart feature enables the operator to resume the operation with the existing master data base rather than the initial data.

2.2.2 Software Routines and Functions.

The current background program operates every quarter-hour or when activated by a wake-up call if a significant event occurs. The flowchart for the current background program is shown in figure 4. The PC program and assorted supporting programs resolve the appropriate data bases and pass information to the users via the master data base. Application of the sensor data to the RCMS logic is shown in appendix B.

The background program determines the eligibility of 62 configurations -- a maximum of 80 may be defined. A conflict occurs if a selected configuration is ineligible. The user is alerted if current conditions cause the conflict; he can then review a list of alternate eligible configurations. If new planning data generates a conflict, the plan is rejected and the plan is reset to the previous acceptable plan.

During the execution of the current background program, ordinary and advisory messages are generated for the user. Management of the data bases guarantees continually updated data and acceptable inputs from the users and the supporting programs. Table 1 describes the critical routines in the current background program.

TABLE 1. CRITICAL ROUTINES FOR CURRENT BACKGROUND PROGRAM

ROUTINE	DESCRIPTION
ADDPLAN	Adds plans to work tables APTSTAT(96) & PEQUIP(96) from PLAN(96).
ASMDISC	Assembly program to run the background program in disconnected mode.
ASSLNK2	Assembly program to link to the WFS data base.
ASSLNK7	Assembly program to link to the master data base.
ASSULK2	Assembly program to unlink from the WFS data base.
ASSULK7	Assembly program to unlink from the master data base.
BACKGR4	Main procedure in the current background program.
BLDPLAN	Builds PLAN(96) from planning logs & sets PSTATUS (planning status).
CLEAR96	Clears 96 bins in APTSTAT & PEQUIP.
CMPMSG	Generates runway composite messages.
CTIME	Converts quarter-hour to four-character time (HHMM).
CTIME4	Converts four-character time (HHMM) to quarter-hour.
CURMSG	Generates current messages (planned and unplanned) using runway and equipment status codes in APTSTAT & PEQUIP.
ELIG	Determines configuration eligibility for the quarter-hour.
GENA	Generates alert and advisory messages.
GENQ	Generates quarter-hour messages for PF-4.
GETMINS	Initializes the arrival runway minimums in RWYMIN.
INITOLD	Saves a copy of the master data base.
MINIMA	Calculates arrival runway minimums for the quarter-hour.
MLOOP	Performs "do loop" for nine quarter-hours to calculate eligibility.
MODUP	Computes current time and controls plan building, plan testing, data base management, eligibility logic, and message generation.
NEWDAY	Clears data base. Initializes equipment status, trigger values, and configuration data.

TABLE 1. ROUTINES FOR [illegible]

ROUTINE	[illegible]
REALM	Reads the master [illegible] base.
RESTART	Reads master data [illegible]
SETUP	Sets current data into APPLIA [illegible]
ISTPLAN	Tests a plan by [illegible]
UPDATEM	Resolves current & planning panels [illegible]
WFSL	Generates the WFS data and writes [illegible] WRITWFS, and ASSUK2.
WIND	Calculates crosswinds & tailwinds for [illegible]
WRITEM	Writes to the master data base.
WRITWFS	Assembly program to write the WFS data base.

2.2.3 Configuration Eligibility Processing.

Configuration eligibility is determined for 9 quarter-hours -- the current quarter-hour and each quarter-hour during the next 2 hours (figures 5A and 5). The background program constructs 96 bins of information representing the airfield conditions for each quarter-hour in the facility day. It assumes that the current airfield conditions will continue through the entire day. As planned activities and changes are introduced, they overlay the existing conditions for the appropriate quarter-hours.

The background program then determines eligibility based on runway closures, arrival runway minimums which are affected by equipment outages, surface and braking conditions, and weather conditions (CAB ceiling and CAB visibility). The eligibility status and the reasons for ineligibility are inserted in the master data base.

A message on the WFS panel alerts the user when a selected configuration becomes ineligible. Portions of the WFS are highlighted to help the user resolve the problem. For example, if an arrival runway in the current configuration is closed, three areas of the screen are highlighted -- the menu item for PF-7 (runway conditions panel), the alert message "CURRENT CONFIGURATION IS INELIGIBLE AT HHMM DUE TO CA" and the word "CURRENT" in the configuration description at the top of the screen.

2.2.4 Message Processing and Handling.

Alerted messages are generated and/or updated by the background program. Table 2 describes the message types and their location on the panels. Message packing, for distribution within the master and WFS data bases, is a separate function from the message generation.

The background program adds or refreshes messages in the data bases during each update cycle. The protocol messages (table 3) are placed in the message line area of the user's screen. In the current mode, they contain the update time and the user's identification. In the planning and forecast modes, they provide the plan status and prevent other users from modifying an unresolved plan.

TABLE 2 MESSAGE TYPES

MESSAGE TYPE	LOCATION ON THE PANELS
1. Alert Message	PF-1 Master Auto Panel Message Line PF-4 Message Panel
2. Planned Configuration	PF-1 Master Auto Panel Message Line PF-4 Message Panel
3. Quarter-Hour Messages	PF-1 Master Auto Panel Message Line PF-4 Message Panel
5. New Planned Outages	PF-1 Master Auto Panel Message Line
6. New Current Outages (Equipment or Runway)	PF-1 Master Auto Panel Message Line PF-4 Message Panel
7. Current and Planned Runway or Equipment Outages (Historical Information)	PF-4 Message Panel PF-7 Runway Conditions Panel (Scroll Area) or PF-8 Equipment Panel (Scroll Area)
8. Runway Composite Messages	PF-1 Master Auto Panel PF-2 Master Panel (Scroll Area)
9. Runway Remarks	PF-3 Current and Planned Eligible Configurations
10. Reasons for Configuration Ineligibility	PF-9 Current and Planned Ineligible Configurations (Selected from PF-3)
11. Planned Weather Change	PF-3 Current and Planned Eligible Configurations (Next Change) PF-6 Weather Panel (Next Three Changes)
12. Protocol Messages	PF-2 - PF-10 Static Panel Message Lines

TABLE 3. MESSAGE LINE PROTOCOL

CURRENT MODE

1. "Screen Updated by [User ID] at [Time]

PLANNING & FORECAST MODES

1. "Available for Input [User ID] Reviewed Plan [Time]"
2. "Available for Input [User ID] Filed Plan [Time]"
3. "Available for Input [User ID] Forced Plan [Time]"
4. "[User ID] Controls Plan [User ID] Reviewing Plan [Time]"
5. "[User ID] Controls Plan [User ID] Plan Accepted [Time]"
6. "[User ID] Controls Plan [User ID] Plan Rejected [Time]"
7. "[User ID] Controls Plan [User ID] Plan Submitted [Time]"

Notes

[User ID] is either AT, AF or CAB
[Time] is Hours, Minutes (HHMM) -- GMT

2.2.5 Data Base Management.

A data base is controlled when it is accessed to transfer information. The foreground program reads and displays the WFS data base which is written by the background program. The foreground program reads and writes only that part of the master data base required for the panel the user is displaying or modifying. The background program reads and writes the entire master data base. The current and planning data is resolved when a user changes a panel or when the background program accesses the master data base.

For the current data, the background program applies the hierarchy of information (table 4) to the current data and to the master data base. It resolves conflicting data by determining what changes occurred since the last update and by applying the most critical condition to the data. Each user resolves the current data in a similar way.

Planning data is rigidly controlled by a protocol between a user and the background program. Plans, submitted by a user from a planning log, are accepted or rejected by the background program based on the eligibility of the selected configurations. No user may enter a plan controlled by another user. The background program maintains the integrity of the master data base by replacing the rejected plan with the previously acceptable plan. The user is prohibited from changing screens until the plan is either accepted or rejected.

Forecast data is controlled just like planning data, with these two exceptions. While a user is in the forecast mode, no other user may modify any planning log or any forecast planning log. A user may force a forecast planning log submission into the current mode; that data will be accepted unconditionally.

TABLE 4. RESOLUTION OF CURRENT INFORMATION

DEFINITION OF STATUS VALUES

'b' (Blank)	- Equipment or Runway Available
'X'	- Equipment Monitor Detection of Out-of-Service
'F'	- Equipment Monitor Detection of Failure
'O'	- Equipment or Runway Removed-from-Service by User (User has Overwrite Capability)
'R'	- Equipment or Runway Returned-to-Service in Plan
'I'	- Equipment or Runway Put In-Service by User (User has Overwrite Capability)
'P'	- Planned Equipment or Runway Out-of-Service
'N'	- CAT Operations not Available
'Y'	- CAT Operations Selected by User

PRIORITY OF CURRENT STATUS VALUES

'b'	Replaces	'X' and 'F' (Previous PC Status)
'X' and 'F'	Replaces	'b'
'P'	Replaces	'b', 'X', and 'F'
'R'	Conflicts with	'O' in Current Quarter-Hour
'P'	Conflicts with	'I' in Current Quarter-Hour
'I'	Replaces all others	*
'O'	Replaces all others	*
'N'	Replaces	'Y'
'Y'	Replaces	'b'

*Only designated users on selected panels have this overwrite capability.

RESOLUTION OF CURRENT STATUS VALUES

1. The priority of current status values is applied whenever the master data base is accessed (e.g., when a user enters new data on a panel).

2. If an 'I' or an 'O' is removed by a user, then 'b', 'X', 'F', and 'P' priority determines the new value.

3. If an 'I' or an 'O' is changed in master data base by designated user, then the master data base entry holds for the current data. (A user may not view a current panel for an extended period of time without considering the effects of changes occurring in the interim time period.)

2.3 FOREGROUND PROGRAM OPERATION.

The foreground program controls the panels selected by and presented to the user. In addition to displaying current data, it enables the user to submit plans for operating the airport and to select current and future configurations throughout the day. The following describes its operation.

2.3.1 Logon Functions and Software Routines.

A user can logon to the software program designed for a particular position or area of responsibility (AT, CAB, AF, etc.). A built-in executive routine starts the program which displays the WFS (PF-1) or the user's primary panel. Each user can select most of the screens, but a user may not need the full capabilities of the foreground program. Therefore, individual user programs will be constructed after the facility personnel provide their recommendations on panel formats and program operation.

The user controls the panel selection through program function (PF) keys. A PF key menu appears on each panel as a quick reference for the user; the function of a particular PF key may change from panel to panel. A cursor function enables the user to enter panel data and a scroll function permits the user to view additional messages or data. A message line on the bottom of the screen provides the status of the panel (update time, planning status, input errors, etc.)

The flowchart of the foreground program is shown in figures 6A and 6B. Appendix C contains the following foreground program documentation -- the PL/1 and assembler language programs used in the foreground user programs, the calling sequence of the programs in the foreground user, and the list of panels and their associated PF keys.

2.3.2 User Modes of Operation.

The foreground program has three modes of operation: current, planning, and forecast. Selection of a PF key initiates the appropriate mode of operation. The protocol messages on the current and planning panels establish communications among the users and between the foreground and the background programs. Protocols for all modes of operation regulate the access and transfer of data in the master data base (table 3).

Current Mode.

The current mode is the normal mode of operation. Typically, the user views the WFS data which is automatically updated every 2 minutes or whenever something significant occurs. The user remains in current mode when selecting a current panel with the PF key. However, a static panel is displayed and no update occurs until the user hits a PF key -- either the same key or another key.

Data entered through a current panel is checked for format errors. If it contains no errors, the data is then resolved with current data, PC data, and planning data. Then the background program is activated to determine configuration eligibility and to generate appropriate messages.

Planning Mode.

The planning mode is entered through the planning/forecast selection panel. The the PF-12 key enables the user to submit planning data directly to the current mode, through the master data base, from any of three planning logs -- weather, runway closure, or equipment.

Unlike the current mode, the user controls the planning panels upon entering the planning mode. No user may enter a plan which another user controls. Once the user submits a plan, he must remain on that panel until the background program determines the plan's acceptability. If the new plan causes a selected configuration to become ineligible within 9 quarter-hours, it is replaced with the previously accepted plan; otherwise, the plan is accepted.

The planning mode logic is straightforward. If a new plan is entered by a user, a complete recycle of the entire day's activities takes place. The new plan is broken down and reassembled in a time-ordered pattern intermixing all three planning panel inputs. This overall plan is then tested to determine if it generates a conflict within 9 quarter-hours. If there is a conflict, the overall current conditions are reconstructed with the previously acceptable plan. Resolution of the overall plan is a user task. If the user cannot pinpoint the problem to a specific item in the plan, he may employ the forecast mode. Within the forecast mode, all plans are accepted and screen data further defines the source of the conflict.

Forecast Mode.

The forecast mode uses a separate forecast background program to allow the user full access to the existing data base in an off-line environment. All the planning functions are available without interfering with the current background and other user foreground programs.

The forecast mode is executed through a specific control panel. It permits the user to communicate directly with another user and to operate independently of the current mode, the master data base, and the background program. The user may insert runway conditions, equipment outages, and weather conditions throughout the facility day using the planning panels. Once a compatible plan and eligible configurations are generated in the forecast mode, the user may forward the new selected configurations and plans to the current mode through the control panel. Then the user is notified of the current mode's acceptance or rejection of the submitted data based on the eligibility of the selected configurations. In addition, designated users have the option of forcing the revised plans and configurations into the current mode. Submissions are made through positive action by the user; a default submission returns to the current data and previous plans.

Selection of the master auto panel (PF-1) cancels the forecast mode and returns the user to the current status panel. The user does not have to submit forecast data or save forecast data.

The forecast mode logic depends on user selections (for example, today's forecast or a forecast for another day). The user can work with another user or work independently. The look-ahead start time can be specified for the forecast session. In addition, re-entry selections to the current background program can include the submission of plans and/or configurations for the entire day's activities.

The forecast mode has its own panels. The user can view and arrange the entire day's activities, look at the day's demand data, and review configuration selection and eligibility for any quarter-hour. The user can change configurations or plan equipment outages to determine if any conflicts occur over extended time periods. By coordinating with others, the user can resolve the day's plans with some assurance of operational compatibility.

The configuration eligibility process in the forecast background program is identical to the eligibility process in the current background program with one exception; it covers up to 96 quarter-hours (from the selected look-ahead time to the end of the day).

2.3.3 Panel Descriptions and User Functions.

The panels shown in figures 7 to 32 comprise the user's interaction with RCMS. The user function associated with the panels is explained in the following subsections. However, there are some common functions for the panels; namely, scrolling, entering data into the data base, and recalling the original data after typing in new data.

The scroll function is initiated by hitting the ENTER key. Panel data is entered into the master data base through the PF-12 key. If a user types in data and wishes to see the original data, the PF-11 RECALL key returns the screen to its initial state. All panels contain a menu of PF keys available to the user, some of which have different functions on different panels. The panels are described below.

Master Auto Panel (PF-1).

The master auto panel (figure 7) summarizes the airfield conditions and displays composite messages for the active runways. No user inputs are allowed. The screen is updated every 2 minutes or when a significant event occurs. Alerts, advisories, and any ordinary messages are displayed on the message line. The user can scroll through the advisory and ordinary messages by pressing the "enter" key. Alert messages are forced onto the screen along with highlighted areas pertaining to the causes of any conflicts. The user may select any panel listed in the menu of PF keys.

Master Panel (PF-2).

The master panel (figure 8) is a static display of the master auto panel with some differences. The user can enter a 30-character note under the NOTE PAD heading, adjacent to the arrival runway minimums. A scroll function enables the user to examine composite messages for all 12 runways.

Configuration Panels (PF-3 and PF-9).

The eligible current configuration panel (figure 9) displays all eligible configurations available to the user through the scroll function. It also contains abbreviated remarks concerning the runway conditions and equipment status. If there is a planned weather change within an hour, a message will appear near the bottom of the screen. The planned eligible configuration panels for the next 5 quarter-hours provide the same information and options. The PF-3 key enables the user to advance the screen to the next quarter-hour.

The eligible configurations are listed in order. Appearing first are those configurations with the same runway headings (flow direction) as the selected configuration. If the capacity satisfies the demand, if the configuration has no wind condition, and if the configuration is not affected by Midways' operations, the configuration is highlighted. The highlighted configurations are the recommended configurations. The remaining configurations are listed in the order of the clockwise flow direction within a given flow direction, the simplest configurations (from an operational aspect) appear first.

If no configurations (with the same flow direction as the selected configuration) are recommended (highlighted), the foreground program highlights the eligible configurations in the next clockwise flow direction which satisfy the capacity, wind, and Midway requirements.

The user may select a new eligible configuration by typing the desired configuration number on the screen and by using the PF-12 key to enter the data.

If the user selects a new configuration, the foreground program automatically updates succeeding quarter-hours throughout the day. This update follows these rules to insure that user selections are maintained in the RCMS.

a. The newly selected configuration replaces only the old configuration selection in each quarter-hour. A planned configuration change in any quarter-hour will remain in that quarter-hour and no further changes will occur after that time.

b. The configuration selected by the user must be eligible for at least an hour. Beyond that hour, configuration eligibility is not a factor in configuration selection. For example, if a new configuration is selected for the second quarter-hour and there are no planned configuration changes, the new configuration will be entered from the second quarter-hour to the end of the day. However, an alert message will be generated if the configuration becomes ineligible.

With the PF-9 key, the user may view the list of ineligible configurations for each quarter-hour (figures 11 and 12). Reasons for the ineligibility are included for each configuration. No user inputs are allowed on this panel.

User Message Panel (PF-4).

The user message panel (figure 13) displays up to 20 recent alert and advisory messages and up to 60 current equipment and runway messages, accessible through the scroll functions. No user inputs are allowed on this panel.

Demand Panel (PF-5).

The demand panel (figure 14) shows the arrival and departure demand for the next six hours. The data is broken down into eight quarter-hour periods and six hour-long periods. The traffic demand is displayed for each arrival and departure fix, and for three aircraft catagories under each arrival fix (total, number of heavy, and number of light). No user inputs are allowed on this panel.

Weather Panel (PF-6).

The weather panel (figure 15) allows the user to enter current weather, forecast weather, CAB ceiling, and CAB visibility. The CAB visibility and CAB ceiling are

some of the criteria for the configuration eligibility. Repeating the PF-6 key displays the local weather forecasts (figure 16).

Runway Conditions Panel (PF-7).

The runway conditions panel (figure 17) allows the user to take a runway out of service (OTS) or to indicate the surface and braking conditions for the airfield. A local remarks area is provided for runway related comments. The user may scroll through 36 messages which give both current and planned runway outages.

Equipment Panel (PF-8).

The equipment panel (figure 18) contains the equipment status and the arrival runway minimums. The user may enter an overwrite character ("I" for in-service, "O" for out-of-service). A field may contain an existing out-of-service "X" detected by the 3270 PC interface equipment or it may be blank (in-service). When the data is entered, new arrival runway minimums are calculated and displayed.

A "Y" (yes) may be entered for CAT II and CAT III operations to indicate the runway is in that mode operation. An "N" indicates the operation is not available due to an equipment outage. The user can examine up to 60 messages concerning current and planned equipment outages by employing the scroll function.

Trigger Value Panel (PF-9).

The trigger value panel (figure 19) allows the user to set various parameters as boundaries above which the background program generates advisory messages.

The user can select crosswind and tailwind advisory levels for both arrivals and departures. A message is generated when one of these thresholds is exceeded.

The warning times for some messages (equipment OTS and RTS, runway OTS and RTS, and planned configurations changes for various reasons) can be specified by the user. These times determine when the user is advised of the upcoming event.

Triggered advisory levels for various parameters (demand, wind, ceiling, visibility, and RVR readings) can be preset by the user. A message is generated when the particular threshold is exceeded. Asterisks (***) indicate that the trigger value was exceeded since it was last set by the user.

Planning/Forecast Selection Panel (PF-10).

The planning mode can be entered directly from the planning/forecast selection panel (figure 20). The weather, runway closure, and equipment planning logs are shown in figures 21, 22, and 23.

[illegible] a planning panel, the plan can be submitted directly to the [illegible] program for acceptance or rejection in the current mode.

[illegible] panel (figure 24) provides the user with a variety of [illegible] dealing with the sharing of the forecast mode data base, reviewing and [illegible] over a seven-day period, testing today's activities, returning to [illegible] stored version of today's forecast, or submitting [illegible] the master data base in the current mode.

Upon entering the forecast mode, the user may select the master data base for "today's" activity or the day file for "today." The user may also choose another day file (for any day within the next six days) to plan outages and select configurations.

After selecting an initial option using the PF-12 key, a summary of the day's configurations is presented along with their eligibility status. A selected start time may be entered so the user can examine any six quarter-hours in detail or change the selected configurations.

If the user selects "today's" activity, the master data base is read into the forecast mode data base and the user controls all planning logs. While in the forecast mode, the user can access any planning log. After changing a planning log, the user can enter it into the forecast mode through the PF-12 key. This WHAT IF option has no constraints; the user can resolve conflicts (configuration ineligibility) by changing configuration selections and/or planned outages. After resolving the conflicts, the user may re-enter the plan or submit all the plans and selected configurations to the current mode through the forecast control panel (PF-10).

The background program treats any submission from the forecast mode as a plan to be accepted or rejected. If the user specifies a forced entry on the control panel, the current background program unconditionally accepts the plan and generates alert messages if any selected configurations are ineligible within 9 quarter-hours.

The following panels are available to the user in the forecast mode:

a. Forecast Status Panel (PF-2). This panel (figure 25) summarized the weather, runway conditions, and equipment status of the particular quarter-hour selected by the user.

b. Forecast Configuration Panel (PF-3). This panel (figure 26) is identical to the eligible configuration panel in the current mode, except it contains both eligible and ineligible configurations.

The configurations are listed in order. Appearing first are those configurations with the [illegible]y headings (flow direction) that best satisfy the eligibility, wind, ca[illegible], and Midway requirements. If the configuration is eligible, if the flow [illegible]ction is best for the wind direction and speed, if the capacity satisfies [illegible]and, if the configuration has no wind conditions, and if the configuratio[illegible]s not affected by Midways' operation, the configuration is highlighted. The highlighted configurations are the recommended configurations. The remaining configurations are listed in order of the clockwise flow direction. Within a given flow direction, the simplest configurations (from an operational aspect) appear first.

c. Forecast Demand (PF-5). This panel (figure 27) is identical to the demand panel in the current mode, except it describes the conditions starting at the quarter-hour selected by the user.

d. Forecast Planning Logs (PF-6, PF-7, and PF-8). The forecast planning logs for the weather, runway closure, and equipment accept user input in any order (figures 28, 29, and 30). The software does the appropriate sorting. Users may input 16 weather items, 16 runway closure items, and 31 equipment

items. The USERID is inserted in the log. If the plan is accepted, the ACCEPT TIME is placed next to each entry.

2.4 SUPPORTING PROGRAMS.

The following supporting programs are employed by the RCMS operational software to automate inputs and/or coordinate activities with distant data sources.

2.4.1 Central Flow Control Facility.

The Central Flow Control Facility will be requested to send the demand data for the Chicago O'Hare Airport every hour. This data will contain the aircraft call sign, the aircraft type, the arrival fix, the departure fix, the estimated time at the arrival fix, and the estimated gate departure time. The DEMAND user will process the data, write it to the master data base, and generate a file containing the entire day's demand for the forecast mode. The Central Flow Control Facility will also have access to all data base information.

2.4.2 PERSONAL COMPUTER (PC3270).

The PC user program collects the status and equipment readings from the Facility Sensor Equipment (figure 31); this data is written to the PC data base and resolved in the master data base for the current background program. In some cases, this process utilizes averaging techniques and rejects unconfirmed data. The PC data base and the master data base are updated periodically or whenever the PC program determines there is a significant change in newly acquired data.

2.4.3 City of Chicago.

The City of Chicago is treated like another foreground user. When the city submits new panel data, the program creates a file which is compatible with their present television screen distribution system. Using a PC program, city personnel can transfer this file, through a keyboard interface device, to the existing TV displays. This permits consistent interpretation of data for both systems.

The City of Chicago RCMS interactive screens include the runway conditions panel (PF-7), the equipment panel (PF-8), and the runway closure and equipment planning logs. In addition, a taxiway/notam panel (figure 32) is accessible from the runway conditions panel and the equipment panel to describe the status of the taxiway system. The taxiway/notam panel can be viewed by selecting the PF-9 key from the PF-7 or PF-8 panel.

2.4.4 Weather Data.

The presentation of weather information and its processing within the RCMS software program depends upon the origin and type of data. There are three sources of weather data: the manual entries into the RCMS panels, the 3270 PC sensor interface, and the National Weather Service (NWS) interface via the Center Weather Service Unit (CWSU).

Table 5 describes the weather data, its source, and its mode of operation within RCMS. Table 6 describes the application and mode of operation for each type of weather information.

The weather information is applied in the RCMS software to:

a. Determine the eligibility of current and planned configurations.

b. Advise the user of weather conditions by presenting both the weather information and triggered advisories for specified conditions.

c. Construct a weather planning log.

In the current mode, RCMS uses CAB ceiling and CAB visibility to determine configuration eligibility. In the planning/forecast mode, it uses the CAB ceiling and visibility, modified by the weather planning/forecast log entries, to determine eligibility.

RCMS generates a wind comment for an eligible configuration when there are excessive crosswinds or tailwind for a runway in the configuration. The planning/forecast mode uses the centerfield wind, modified by the wind entries in the weather planning/forecast log.

Triggered advisories are generated when CAB ceiling or visibility changes or when crosswinds, tailwinds, or PC sensor data (for wind, ceiling, RVR readings) exceed a level preset by the user.

The weather forecast log can be changed by manual entry of planned weather or by automatic entry of the ORD FT reports. At the user's request, RCMS translates the ORD FT weather reports into wind, ceiling, and visibility entries in the weather forecast log.

The NWS provides several types of reports: SA (Surface Observations), FT (Terminal Forecasts), and SW (Selected Weather Warnings). Included in the SW reports are AWW (Severe Weather Forecast Alerts) and WST (Convection Segments). An attempt will be made to have the weather data updated when special bulletins are issued. This arrangement demands upon the session level interface currently being defined with the Center Weather Service Unit.

2.4.5 Remote Terminal.

The remote terminal for the RCMS can support program development throughout the RCMS effort. A software programmer can develop and test an application program before introducing it into the operational environment.

TABLE 5. DESCRIPTION OF WEATHER DATA

SOURCE OF DATA	DEFINITION OF WEATHER DATA	MODE OF OPERATION
WX Panel (from CAB)	Ceiling and Visibility	Current
WX Planning Log (from AT & CAB)	Planning Ceiling, Visibility, and Wind	Planning
WX Forecast Log (from AT & CAB)	Forecast Ceiling, Visibility and Wind	Forecast
3270 PC Interface (Automated Inputs from Field Equipment)		
LLWAS	Center Field Wind	Current
Field Ceilometer	Computer Ceilometer Reading	Current
RVR	Runway Visual Range Reading	Current
DASE	Digital Altimeter Reading	Current
NWS Interface via CWSU (Computerized Weather Reports)		
SA Reports	ORD - Surface Weather Report	Current
FT Reports	ORD - Terminal Forecast	Forecast
SA Reports	Nearby Airports Weather Report	Current
FT Reports	Nearby Airports Forecast	Forecast
AWW Reports	Severe Weather Forecast Alerts	Forecast
WST Reports	Convection Segments	Current

TABLE 6. RCMS APPLICATION OF WEATHER DATA

APPLICATION	MODE OF OPERATION	SOURCE OF DATA
Current Configuration Eligibility	Current	CAB Ceiling and Visibility
Planned/Forecast Configuration Eligibility	Planning /Forecast	CAB Ceiling and Visibility modified by weather planning/forecast log
Wind Comment for Eligibile Configurations	Current	LLWAS Center Field Wind resulting in excessive crosswinds and tailwinds for a runway in the configuration
Wind Comment for Eligible Configurations	Planning /Forecast	LLWAS Center Field Wind modified by weather planning/forecast log, resulting in excessive crosswinds or tailwinds for a runway in the configuration
Weather Information for RCMS Panels	Current	NWS computerized weather reports for ORD and nearby airports
Triggered Advisories	Current	3270 PC equipment by RCMS generated readings reaching preset trigger values for wind, ceiling, RVR, crosswind, tailwind -- or -- any change in CAB ceiling or visibility
Weather Planning Log	Planning	Manual entry
Weather Forecast Log	Forecast	Manual entry or automatic entry of planned weather and ORD FT reports

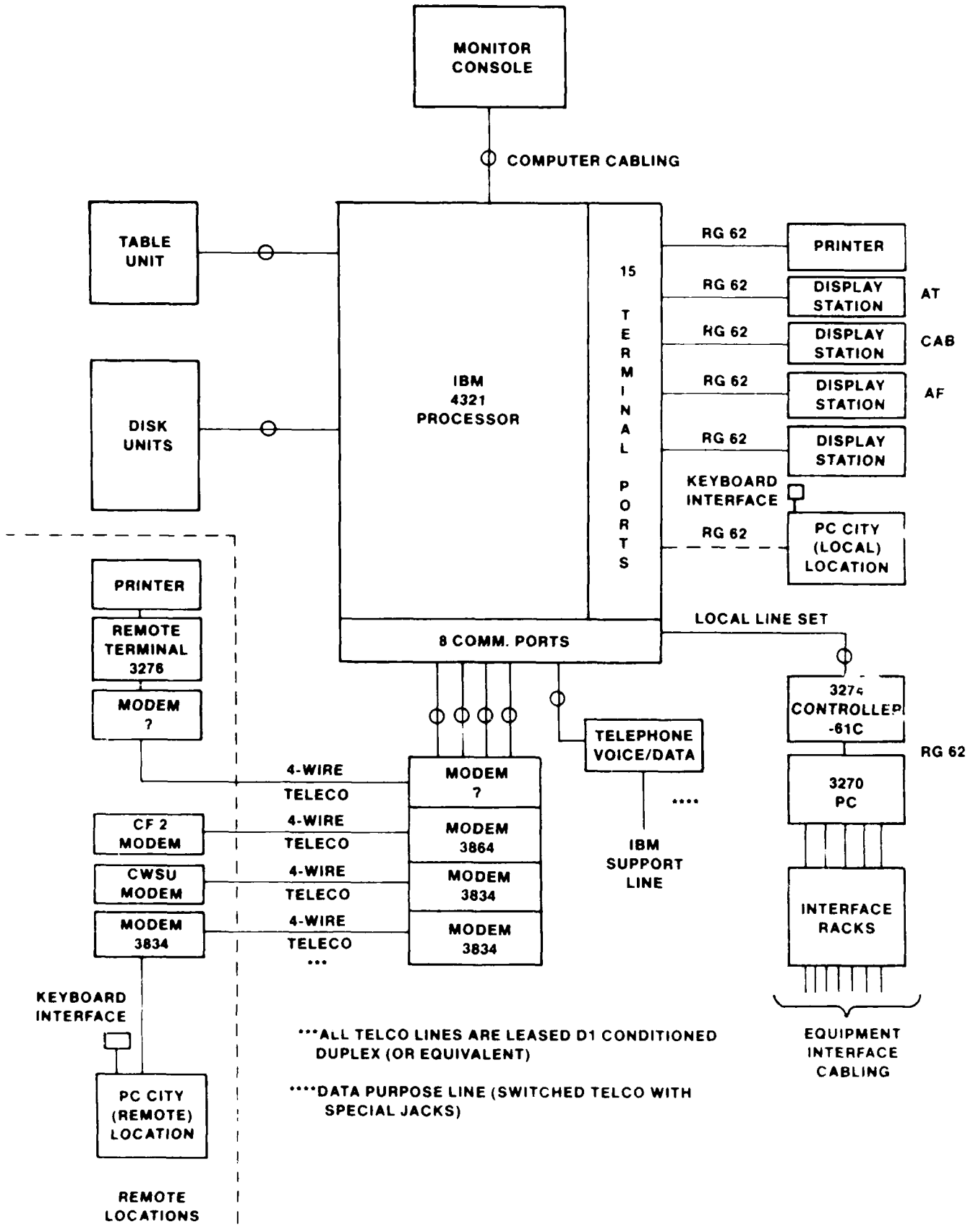


FIGURE 1. RUNWAY CONFIGURATION MANAGEMENT SYSTEM HARDWARE

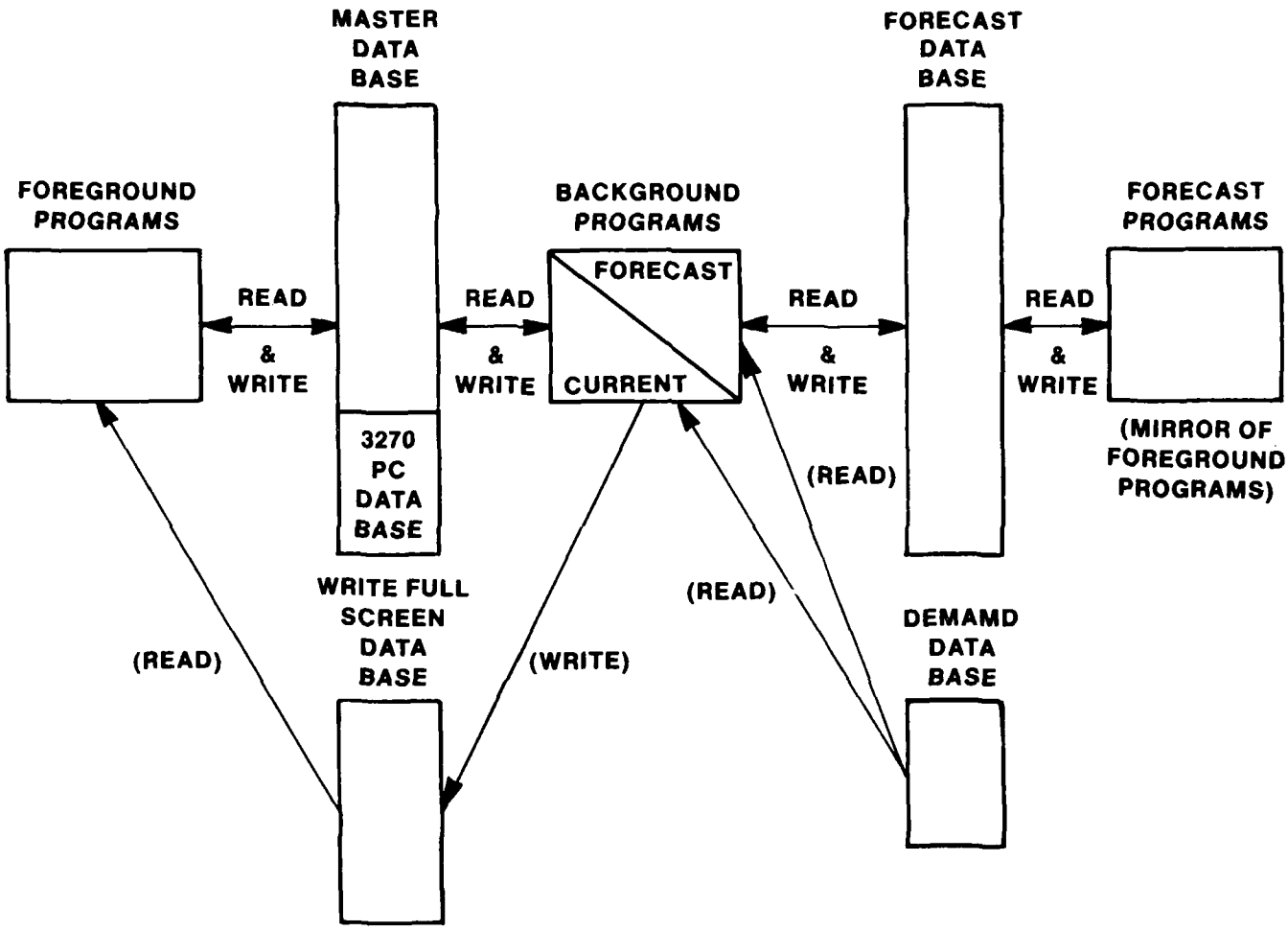


FIGURE 2. RELATIONSHIP OF DATA BASES TO SOFTWARE PROGRAMS

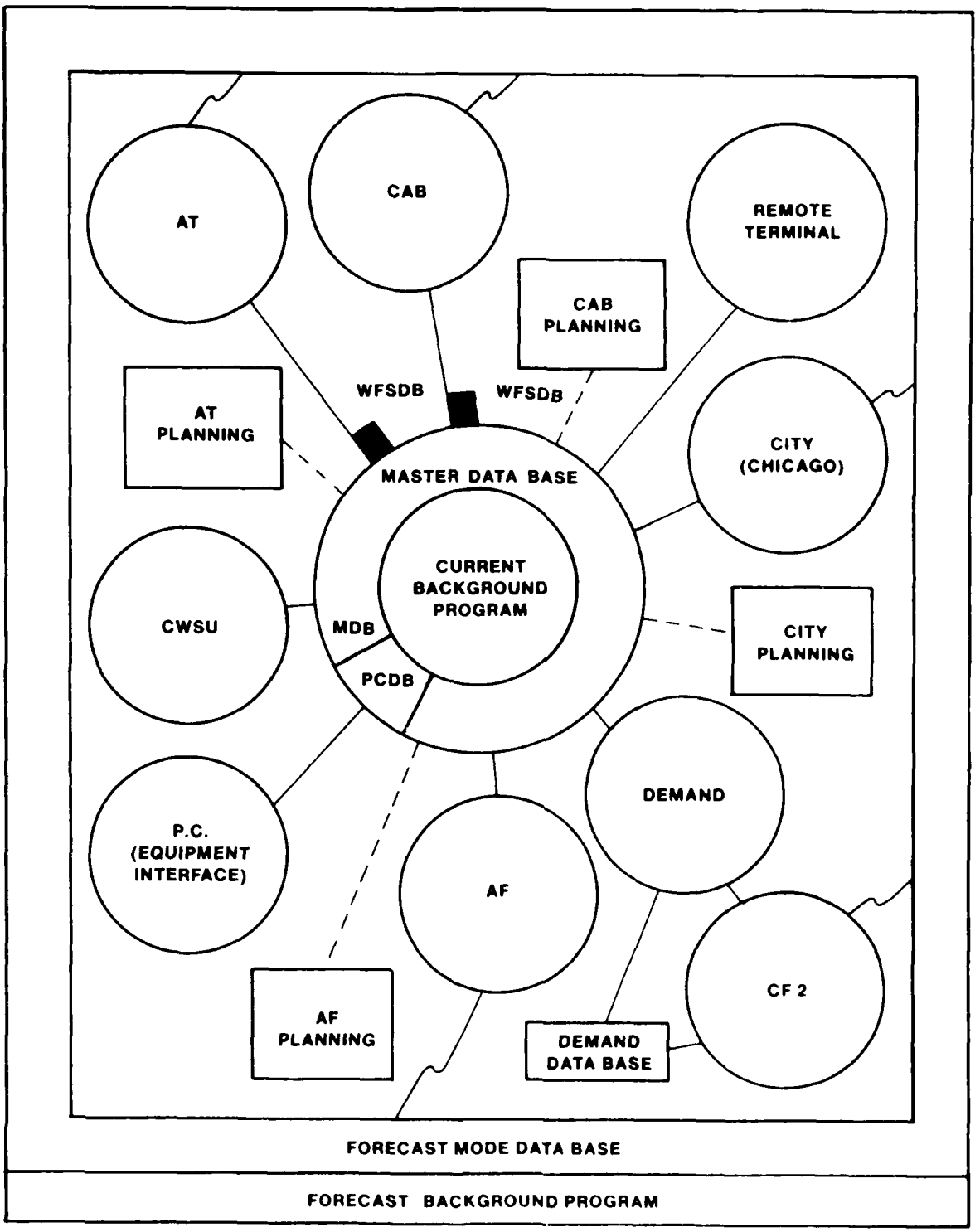


FIGURE 3. RELATIONSHIP OF DATA BASES TO MODES OF OPERATION

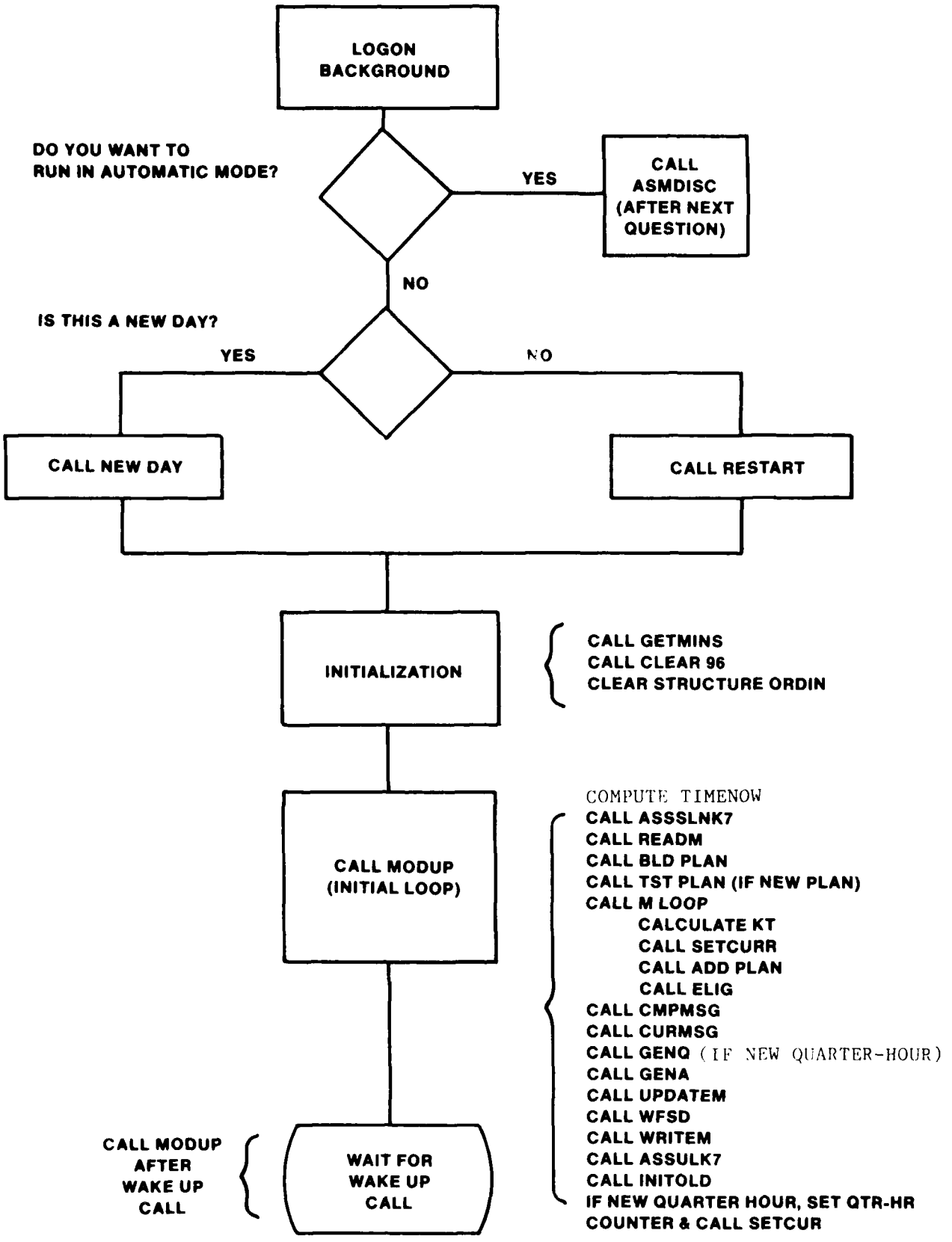


FIGURE 4. CURRENT BACKGROUND PROGRAM FLOWCHART

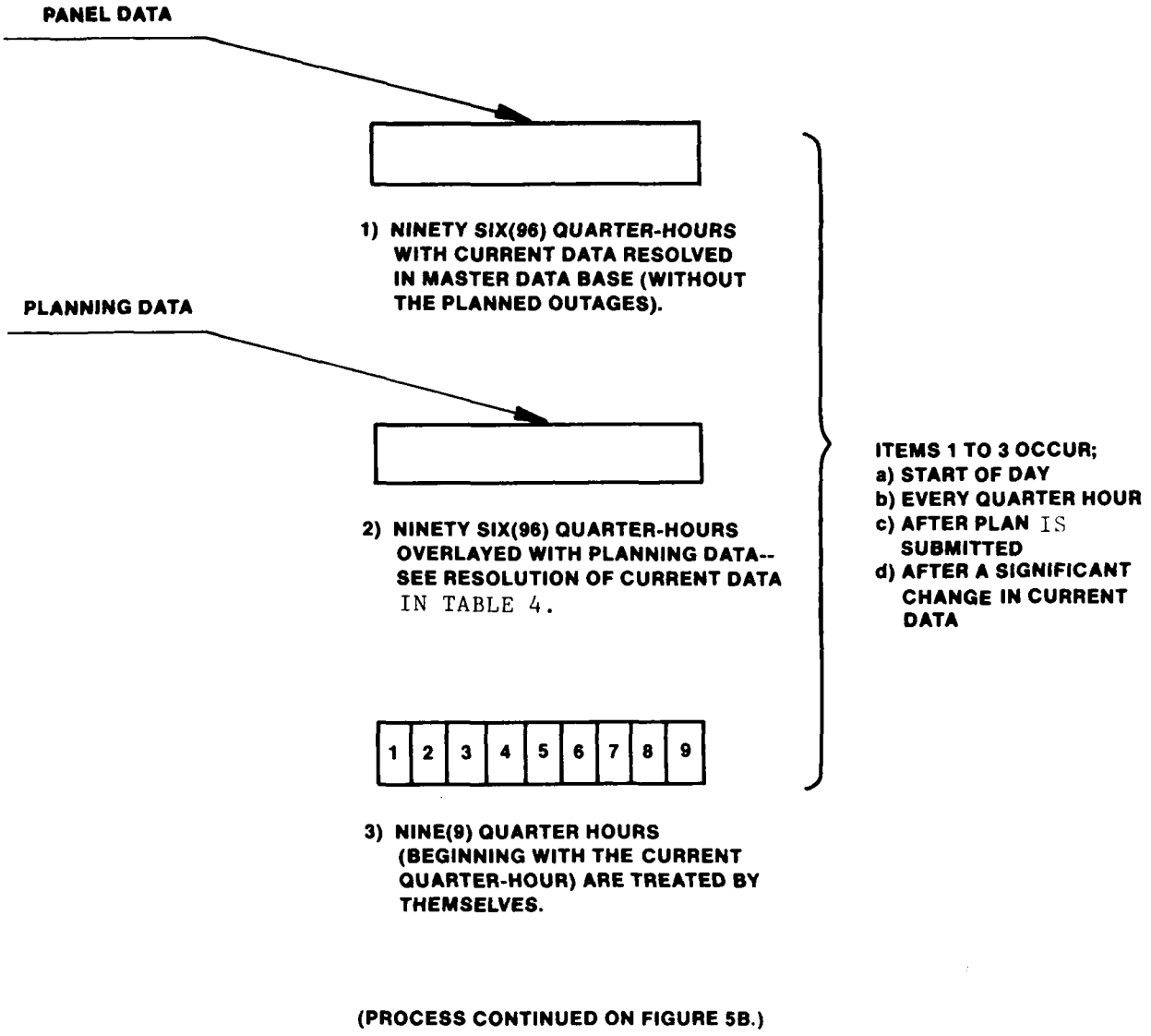
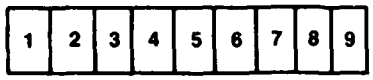


FIGURE 5A. QUARTER-HOUR PROCESSING (1 of 2 Sheets)

FOR CURRENT MODE
NINE (9) QUARTER-HOURS

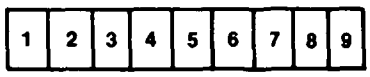


4) A "DO LOOP" EXAMINES CONFIGURATION ELIGIBILITY FOR THE 9 QUARTER-HOURS
5) AN INELIGIBLE SELECTED CONFIGURATION IN THE 9 QUARTER-HOURS GENERATES ALERT(S) -- PROBLEM(S) SHOULD BE RESOLVED USING THE APPROPRIATE CONFIGURATION PANEL(S)

} ITEMS 4 & 5 EVERY CURRENT UPDATE

-OR-

FOR PLANNING MODE
NINE (9) QUARTER-HOURS



6) A "DO LOOP" EXAMINES CONFIGURATION ELIGIBILITY FOR THE 9 QUARTER-HOURS
7) AN INELIGIBLE SELECTED CONFIGURATION IN THE 9 QUARTER-HOURS CAUSES THE SUBMITTED PLAN(S) TO BE REJECTED. PREVIOUSLY ACCEPTED PLANS ARE RETAINED.

} ITEMS 6 & 7 OCCUR WHEN A PLAN IS SUBMITTED

FIGURE 5B. QUARTER-HOUR PROCESSING (2 of 2 Sheets)

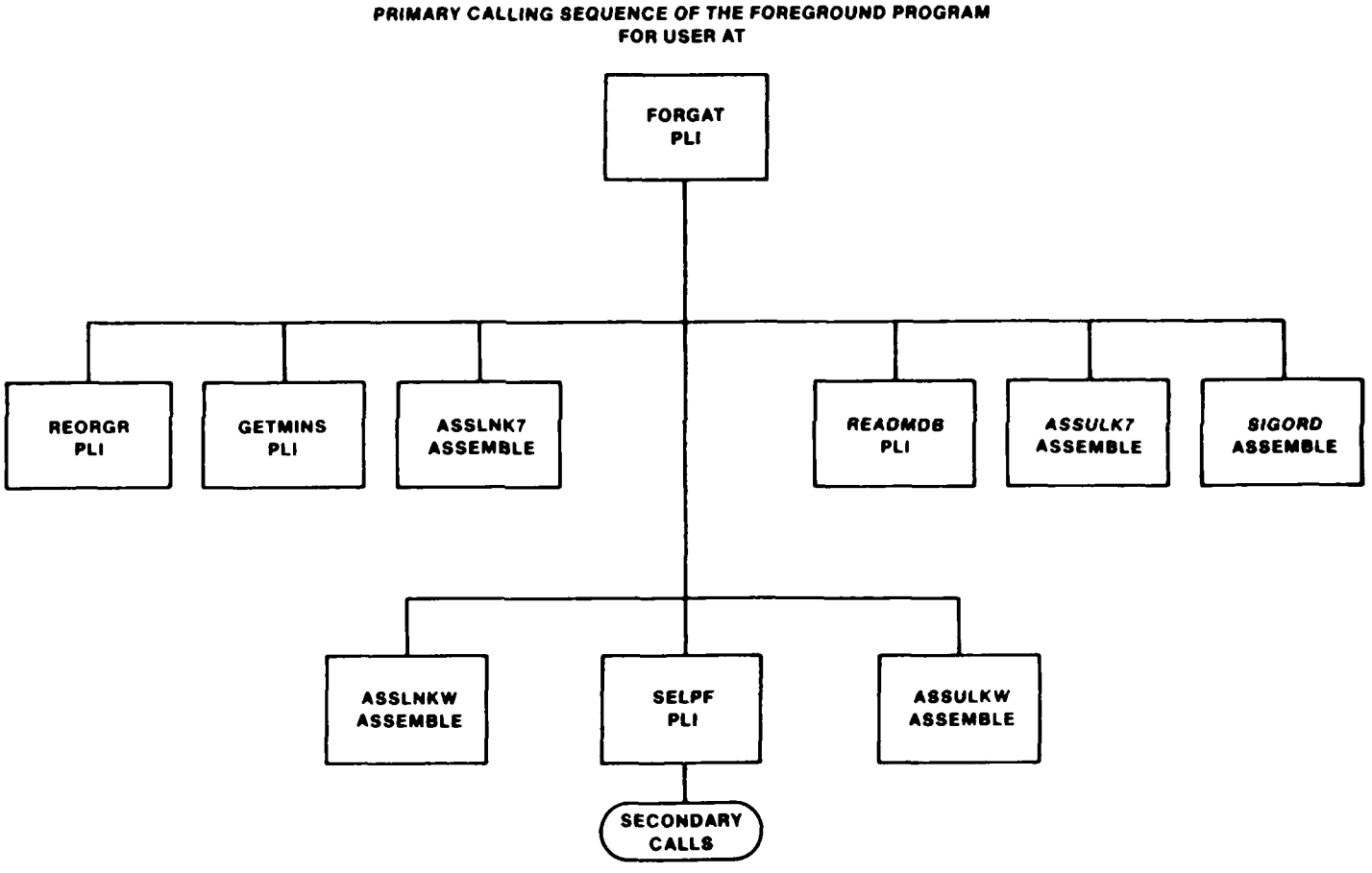


FIGURE 6. FOREGROUND PROGRAM FLOWCHART (1 of 2 Sheets)

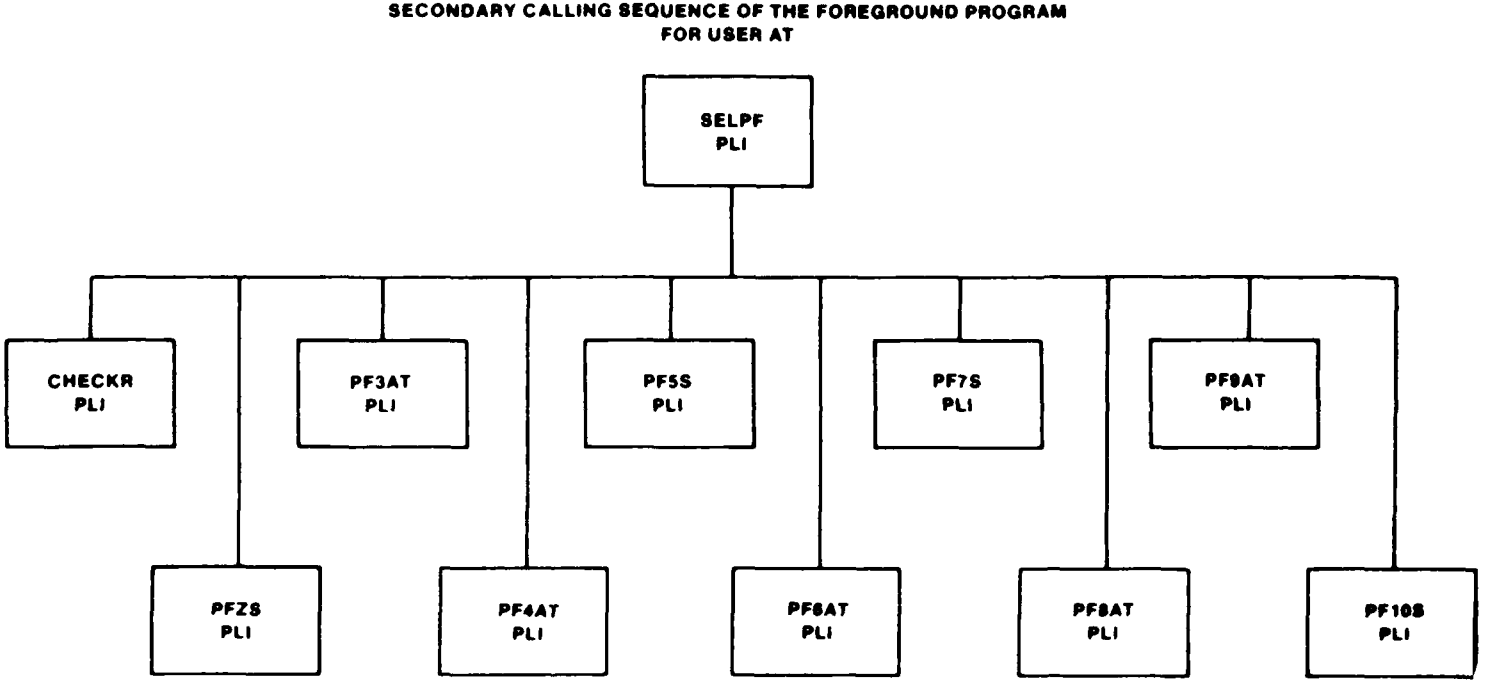


FIGURE 6. FOREGROUND PROGRAM FLOWCHART (2 of 2 Sheets)

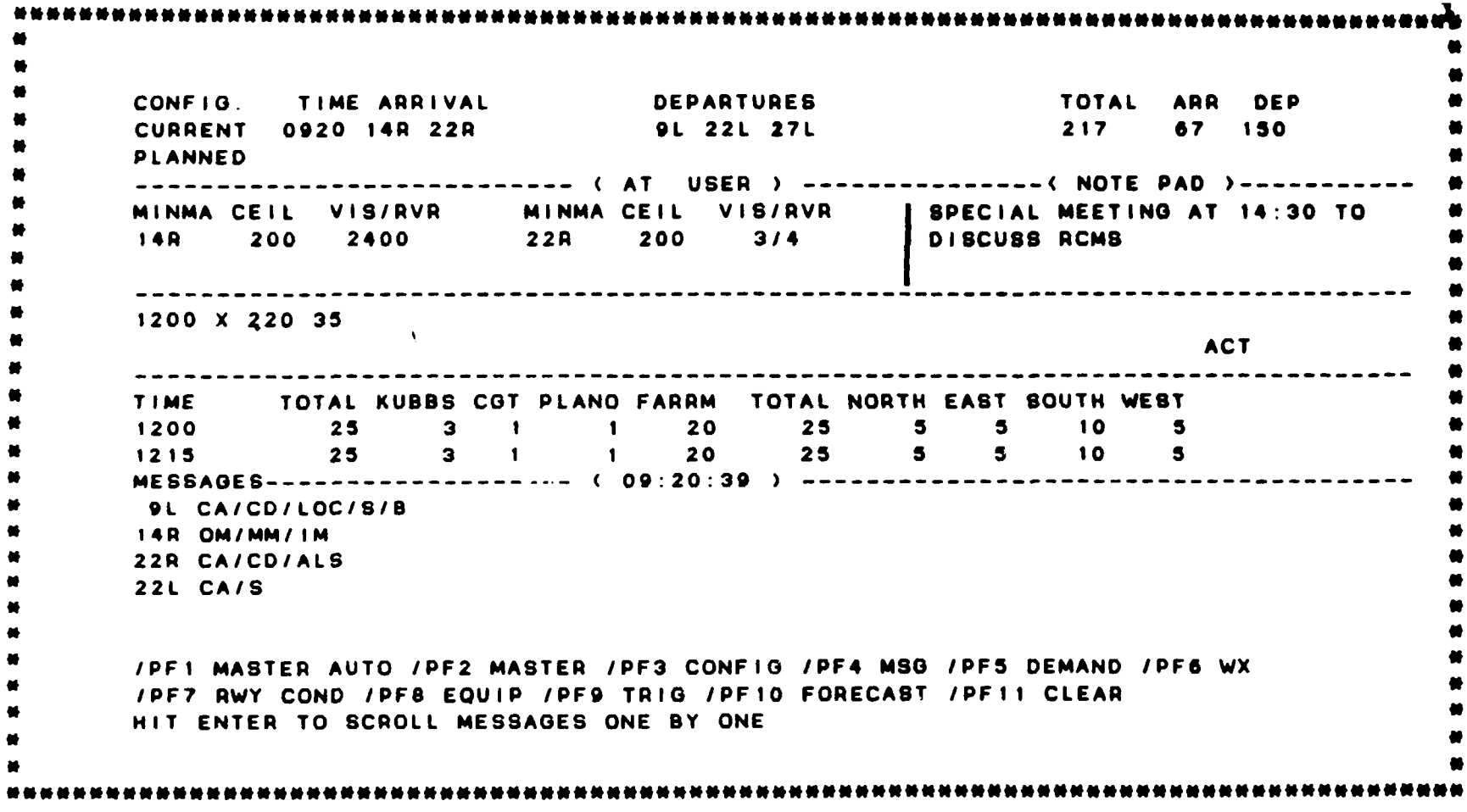


FIGURE 7. PF-1 MASTER AUTO PANEL

```
STATIC DISPLAY          PF2 -- MASTER PANEL                1607 GMT       CAPACITY
CONFIG.   TIME ARRIVALS              DEPARTURES                          TOTAL  ARR  DEP
CURRENT   1607 14R 22R               22L 27L                       VFR   181   68  113
PLANNED
-------------------------------------------------------------( NOTEPAD )------------
MINMA CEIL  VIS/RVR      MINMA CEIL  VIS/RVR     | SPECIAL MEETING AT 14:30 TO
14R    200   1800        22R    200   1/2        | DISCUSS RCMS
                                                 |
-------------------------------------------------------------( ACTUAL )----
1200 X 220 35                                                  WIND    CEILING
                                                               2705    SCT 5000
-------------------------------------------------------------------------------
TIME      TOTAL KUBBS CGT PLANO FARRM  TOTAL NORTH EAST SOUTH WEST  |  0 WX-PLNS
1200         25     3   1     1    20     25     5    5    10    5  |  0 RWY *
1215         25     3   1     1    20     25     5    5    10    5  |  1 EQP *
SCROLL  4 LINES-------------------------------------------------------------------
 9L CA/CD/S/B




/PF1 MASTER AUTO/PF2 MASTER/PF3 CONFIG/PF4 MSG/PF5 DEMAND/PF6 WX/PF7 RWY COND
/PF8 EQUIP/PF9 TRIG/PF10 FORECAST/PF11 RECALL/PF12 ENTER/PA2 PRINT
SCREEN UPDATED BY AT  1312 GMT
```

FIGURE 8. PF-2 MASTER PANEL

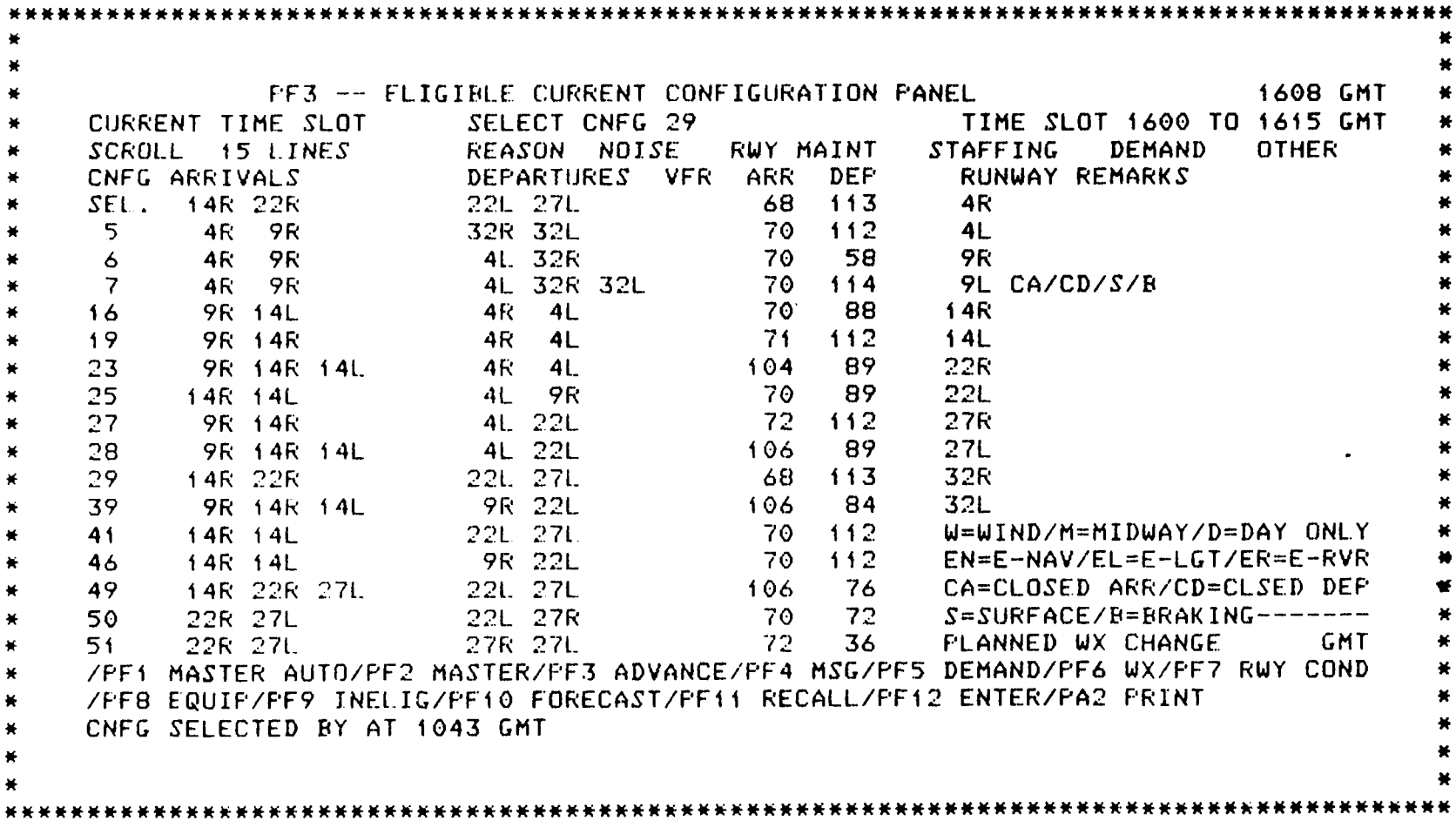


FIGURE 9. PF-3 ELIGIBLE CURRENT CONFIGURATION PANEL

```
*****************************************************************************************
*                                                                                       *
*                                                                                       *
*              PF3 -- ELIGIBLE PLANNING CONFIGURATION PANEL                  1608 GMT    *
*    PLAN TIME SLOT #2       SELECT CNFG 29                TIME SLOT 1630 TO 1645 GMT    *
*    SCROLL  15 LINES        REASON  NOISE   RWY MAINT   STAFFING   DEMAND   OTHER X     *
*    CNFG ARRIVALS           DEPARTURES  VFR  ARR  DEP     RUNWAY REMARKS                *
*    SEL.  14R 22R           22L 27L           68  113     4R                            *
*     5     4R  9R           32R 32L           70  112     4L                            *
*     6     4R  9R            4L 32R           70   58     9R                            *
*     7     4R  9R            4L 32R 32L       70  114     9L CA/CD/S/B                  *
*    16     9R 14L            4R  4L           70   88    14R                            *
*    19     9R 14R            4R  4L           71  112    14L                            *
*    23     9R 14R 14L        4R  4L          104   89    22R                            *
*    25    14R 14L            4L  9R           70   89    22L                            *
*    27     9R 14R            4L 22L           72  112    27R                            *
*    28     9R 14R 14L        4L 22L          106   89    27L                            *
*    29    14R 22R           22L 27L           68  113    32R                            *
*    39     9R 14R 14L        9R 22L          106   84    32L                            *
*    41    14R 14L           22L 27L           70  112    W=WIND/M=MIDWAY/D=DAY ONLY     *
*    46    14R 14L            9R 22L           70  112    EN=E-NAV/EL=E-LGT/ER=E-RVR     *
*    49    14R 22R 27L       22L 27L          106   76    CA=CLOSED ARR/CD=CLSED DEP     *
*    50    22R 27L           22L 27R           70   72    S=SURFACE/B=BRAKING-------     *
*    51    22R 27L           27R 27L           72   36    PLANNED WX CHANGE      GMT     *
*    /PF1 MASTER AUTO/PF2 MASTER/PF3 ADVANCE/PF4 RETURN TO ELIGIBLE CURRENT CONFIG       *
*    /PF9 INELIG/PF11 RECALL /PF12 ENTER/PA2 PRINT                                      *
*    CNFG SELECTED BY AT 1043 GMT                                                       *
*                                                                                       *
*                                                                                       *
*****************************************************************************************
```

FIGURE 10. PF-3 (REPEATED) ELIGIBLE PLANNING CONFIGURATION PANEL FOR NEXT QUARTER-HOUR

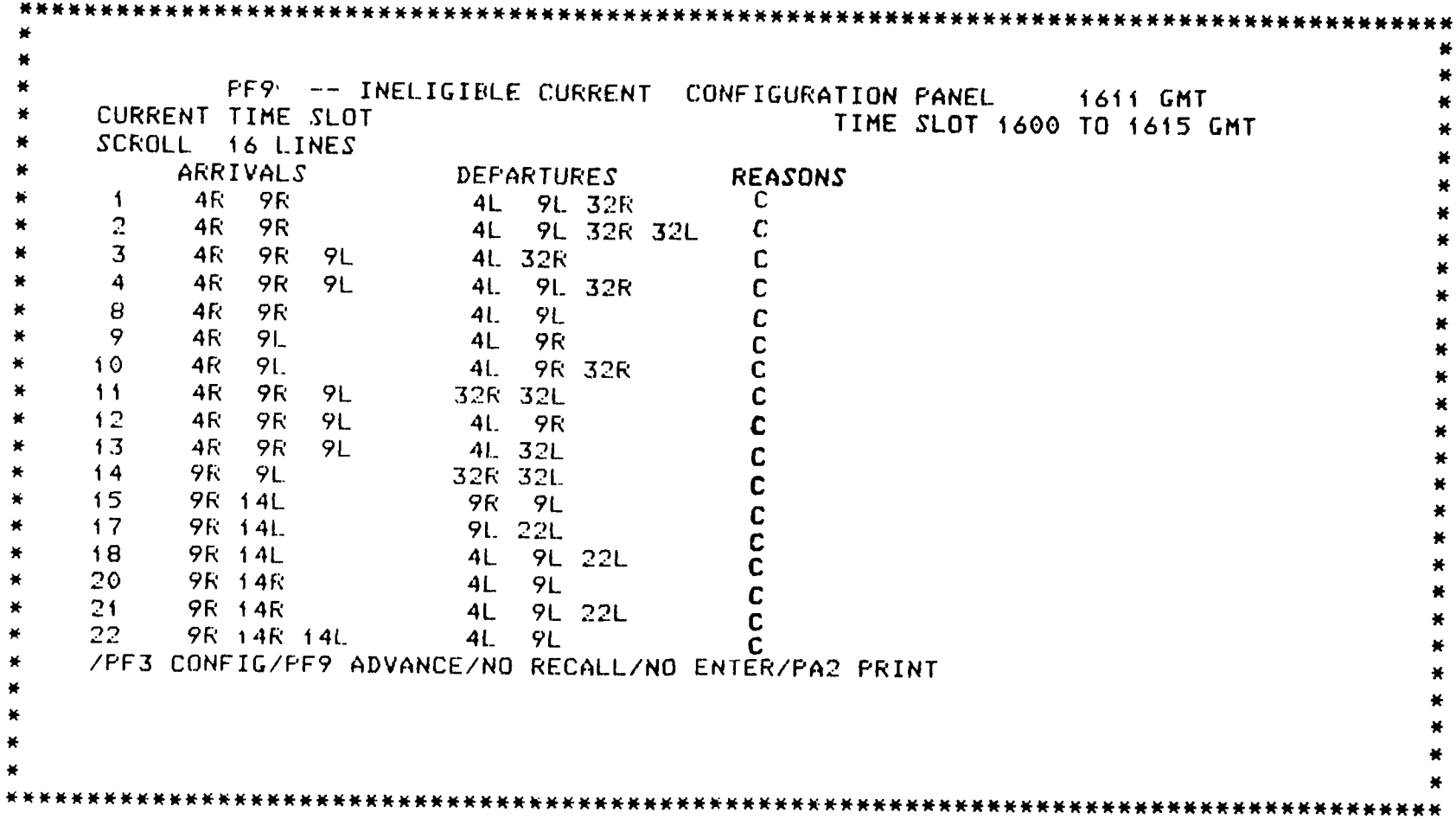


FIGURE 11. PF-9 (SELECTED FROM PF-3) INELIGIBLE PLANNING CONFIGURATION PANEL

```
*****************************************************************************
*                                                                           *
*                                                                           *
*          PF9  -- INELIGIBLE PLANNING CONFIGURATION PANEL     1611 GMT    *
*   PLAN TIME SLOT #3                              TIME SLOT 1645 TO 1700 GMT *
*   SCROLL  16 LINES                                                        *
*        ARRIVALS          DEPARTURES        REASONS                        *
*    1    4R  9R            4L  9L 32R        C                             *
*    2    4R  9R            4L  9L 32R 32L    C                             *
*    3    4R  9R  9L        4L 32R            C                             *
*    4    4R  9R  9L        4L  9L 32R        C                             *
*    8    4R  9R            4L  9L            C                             *
*    9    4R  9L            4L  9R            C                             *
*   10    4R  9L            4L  9R 32R        C                             *
*   11    4R  9R  9L       32R 32L            C                             *
*   12    4R  9R  9L        4L  9R            C                             *
*   13    4R  9R  9L        4L 32L            C                             *
*   14    9R  9L           32R 32L            C                             *
*   15    9R 14L            9R  9L            C                             *
*   17    9R 14L            9L 22L            C                             *
*   18    9R 14L            4L  9L 22L        C                             *
*   20    9R 14R            4L  9L            C                             *
*   21    9R 14R            4L  9L 22L        C                             *
*   22    9R 14R 14L        4L  9L            C                             *
*   /PF3 CONFIG/PF4 RETURN TO INELIGIBLE CURRENT CONFIG/PF9 ADVANCE/NO  RECALL *
*   /NO ENTER/PA2 PRINT                                                     *
*                                                                           *
*                                                                           *
*                                                                           *
*****************************************************************************
```

FIGURE 12. PF-9 (REPEATED FROM PF-9) INELIGIBLE PLANNING CONFIGURATION PANEL FOR NEXT QUARTER-HOUR

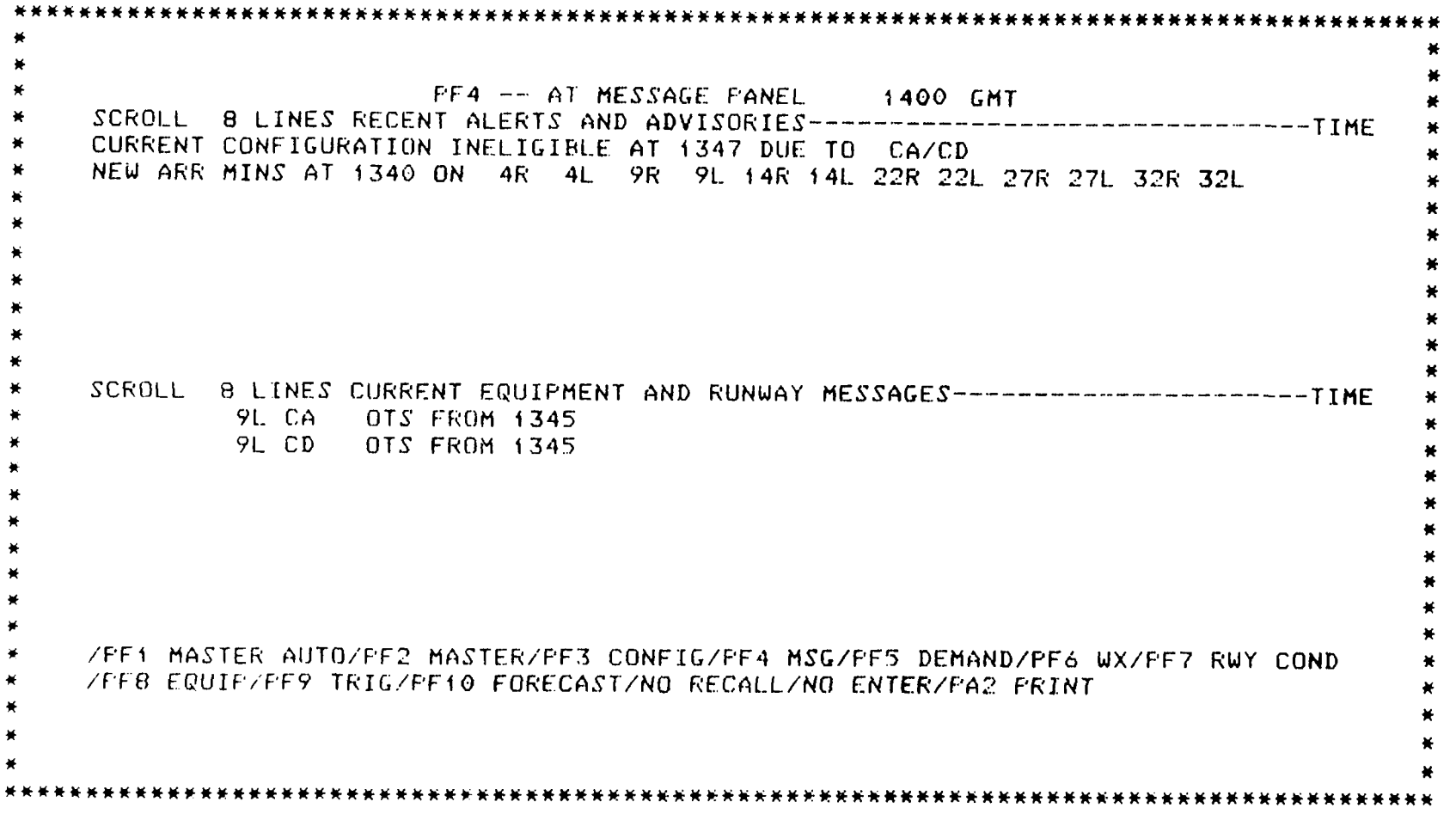


FIGURE 13. PF-4 USER MESSAGE PANEL

PF5 -- DEMAND PANEL 1200 GMT

TIME	ARRIVALS TOTAL	X/Y/Z X= TOTAL Y=HEAVY Z= LIGHT KURBS	CGT	PLANO	FARMM	DEPARTURES TOTAL	N	E	S	W
1200	25	3/1/1	1/ /1	1	20/10/10	25	5	5	10	5
1215	25	3/1/1	1/ /1	1	20/10/10	25	5	5	10	5
1230	25	3/1/1	1/ /1	1	20/10/10	25	5	5	10	5
1245	25	3/1/1	1/ /1	1	20/10/10	25	5	5	10	5
1200 1300	100	12/4/4	4/ /4	4	80/40/40	100	20	20	40	20
1300	25	3/1/1	1/ /1	1	20/10/10	25	5	5	10	5
1315	25	3/1/1	1/ /1	1	20/10/10	25	5	5	10	5
1330	25	3/1/1	1/ /1	1	20/10/10	25	5	5	10	5
1345	25	3/1/1	1/ /1	1	20/10/10	25	5	5	10	5
1300 1400	100	12/4/4	4/ /4	4	80/40/40	100	20	20	40	20
1400	100	12/4/4	4/ /4	4	80/40/40	100	20	20	40	20
1500	100	12/4/4	4/ /4	4	80/40/40	100	20	20	40	20
1600	100	12/4/4	4/ /4	4	80/40/40	100	20	20	40	20
1700	100	12/4/4	4/ /4	4	80/40/40	100	20	20	40	20

/PF1 MASTER AUTO/PF2 MASTER/PF3 CONFIG/PF4 MSG/PF5 DEMAND/PF6 WX/PF7 RWY COND
/PF8 EQUIP/PF9 TRIG/PF10 FORECAST/NO RECALL/NO ENTER/PA2 PRINT
SCREEN UPDATED BY CF 1200 GMT

FIGURE 14. PF-5 DEMAND PANEL

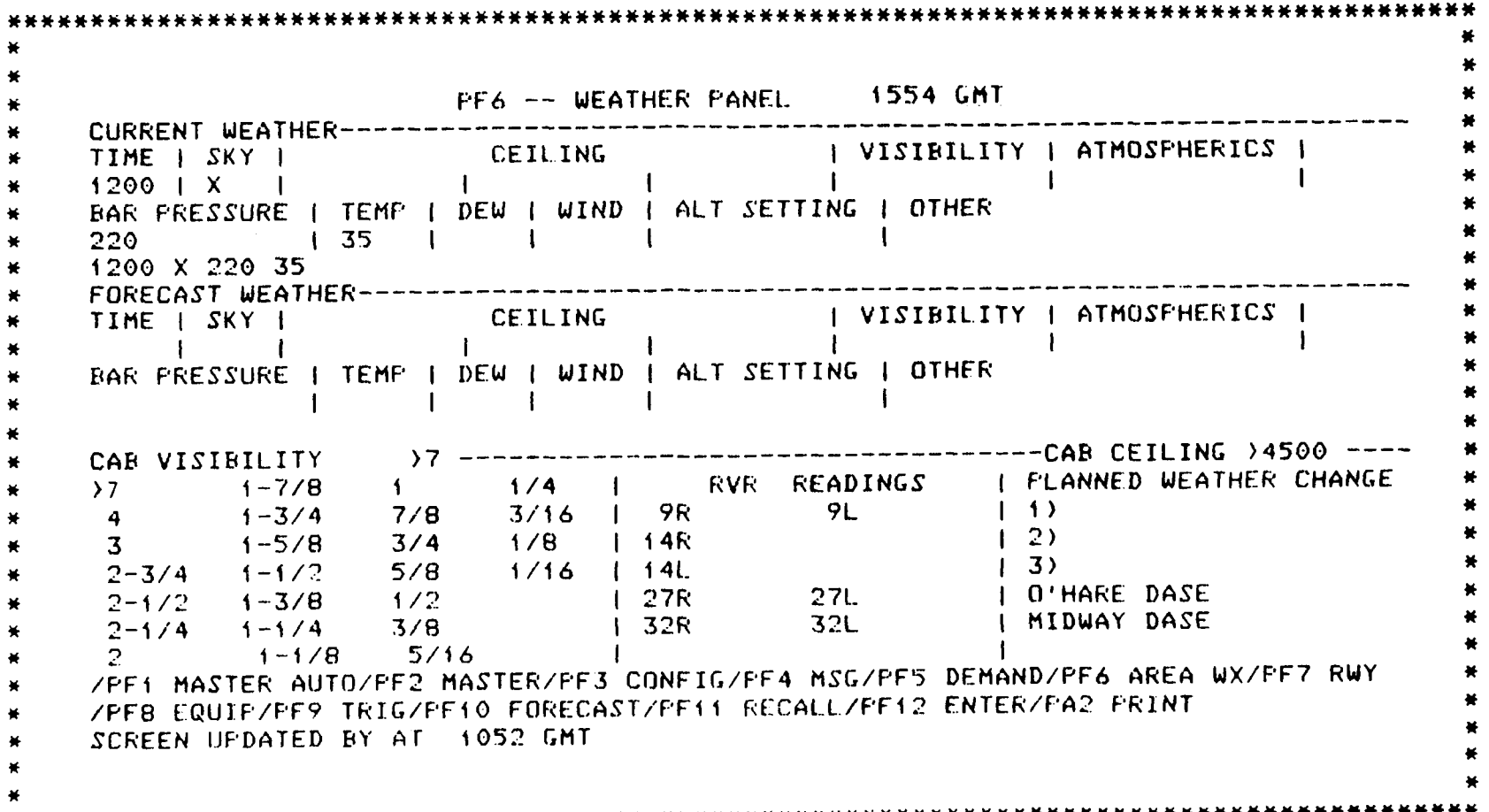


FIGURE 15. PF-6 WEATHER PANEL

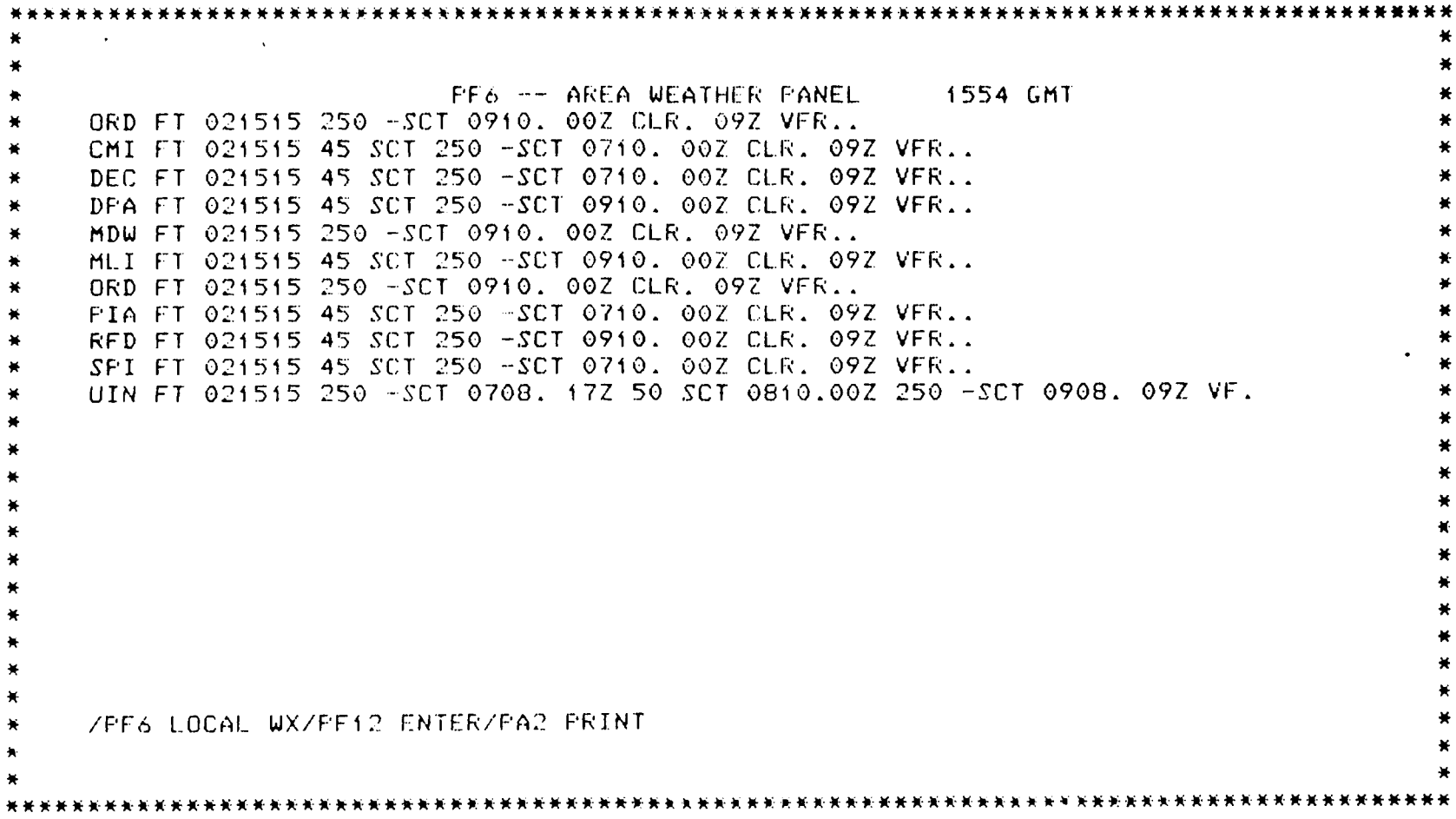


FIGURE 16. PF-6 (REPEATED) AREA WEATHER PANEL

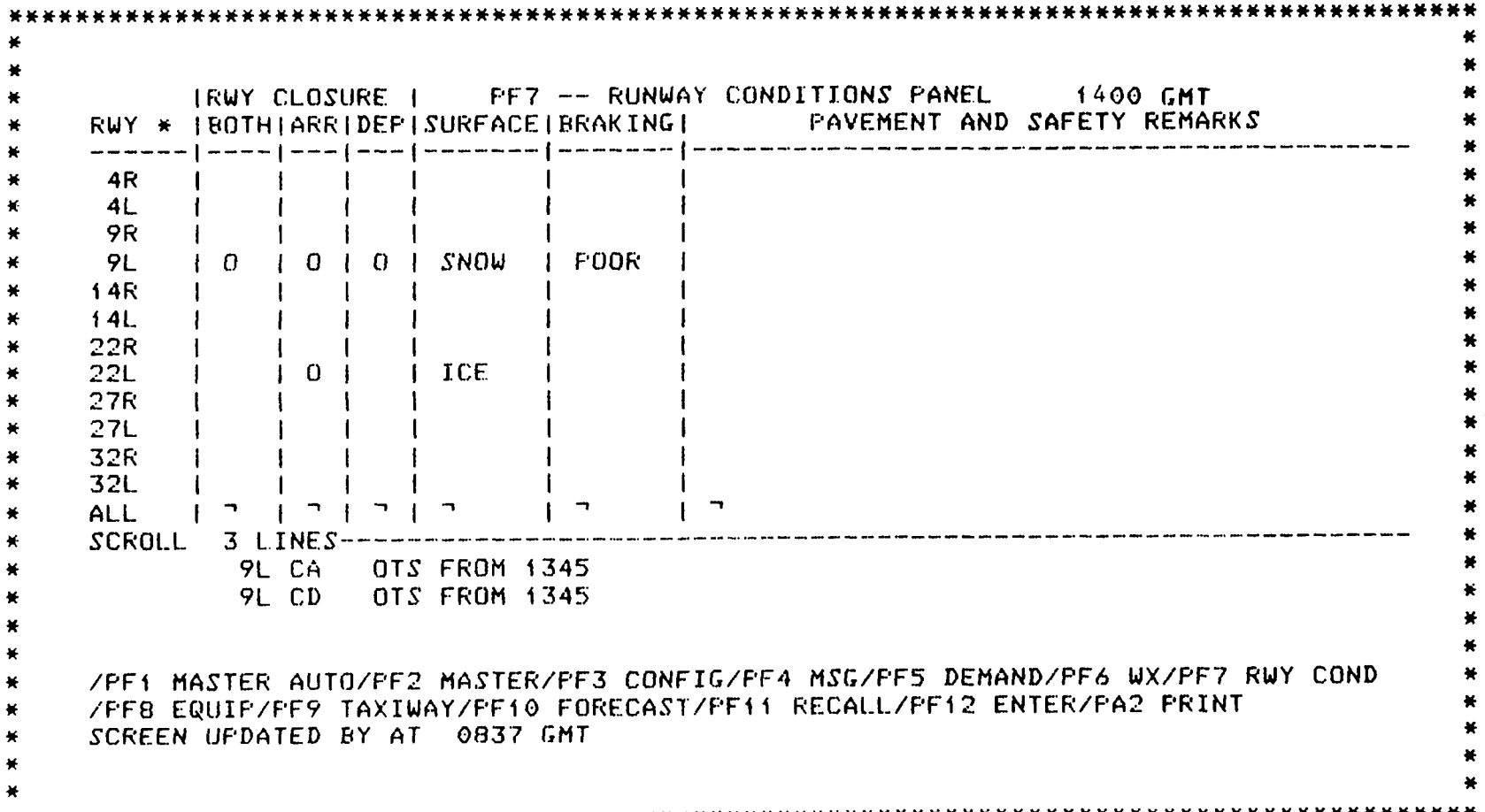


FIGURE 17. PF-7 RUNWAY CONDITIONS PANEL

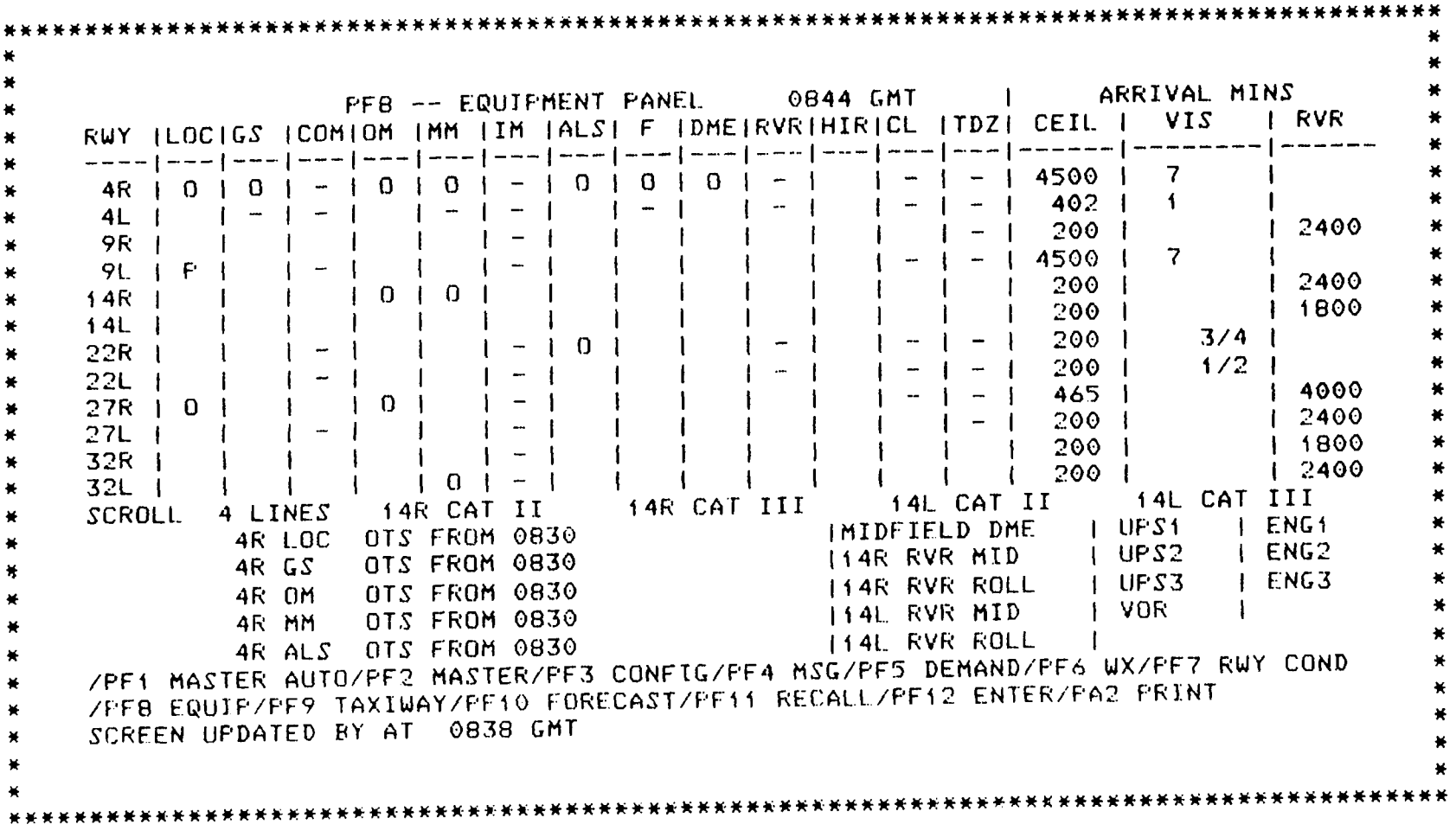


FIGURE 18. PF-8 EQUIPMENT PANEL

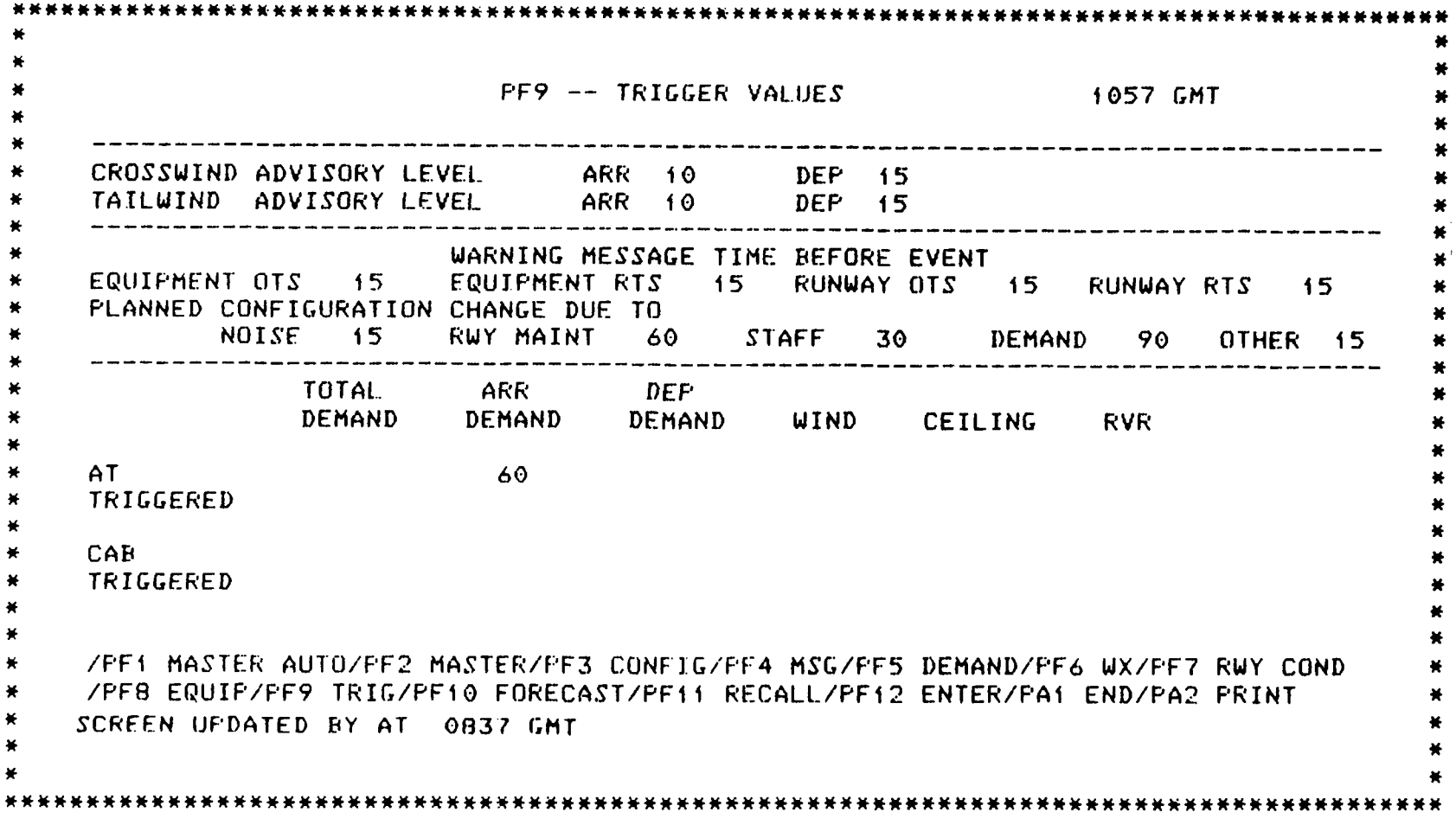


FIGURE 19. PF-9 TRIGGER VALUE PANEL

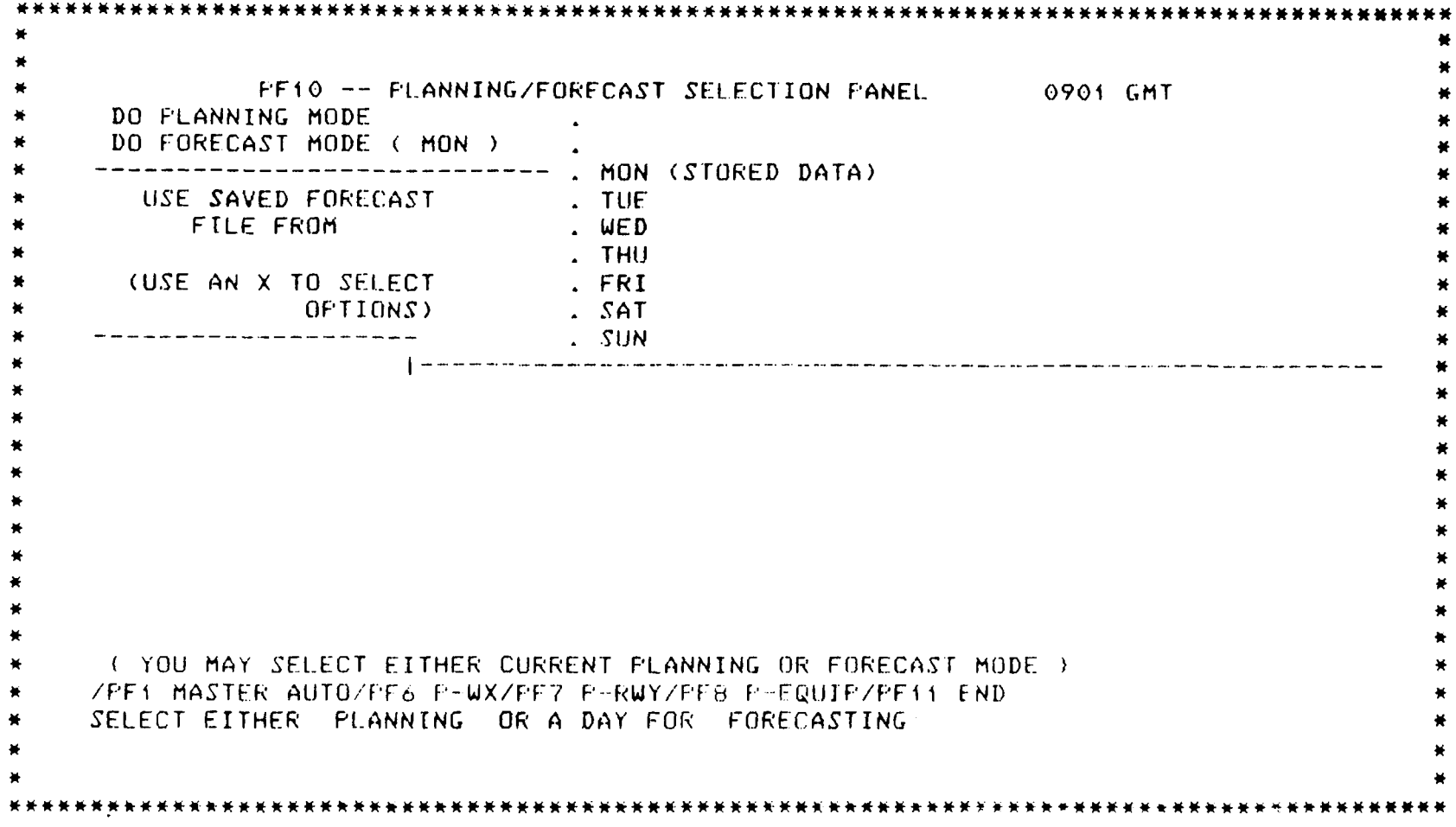


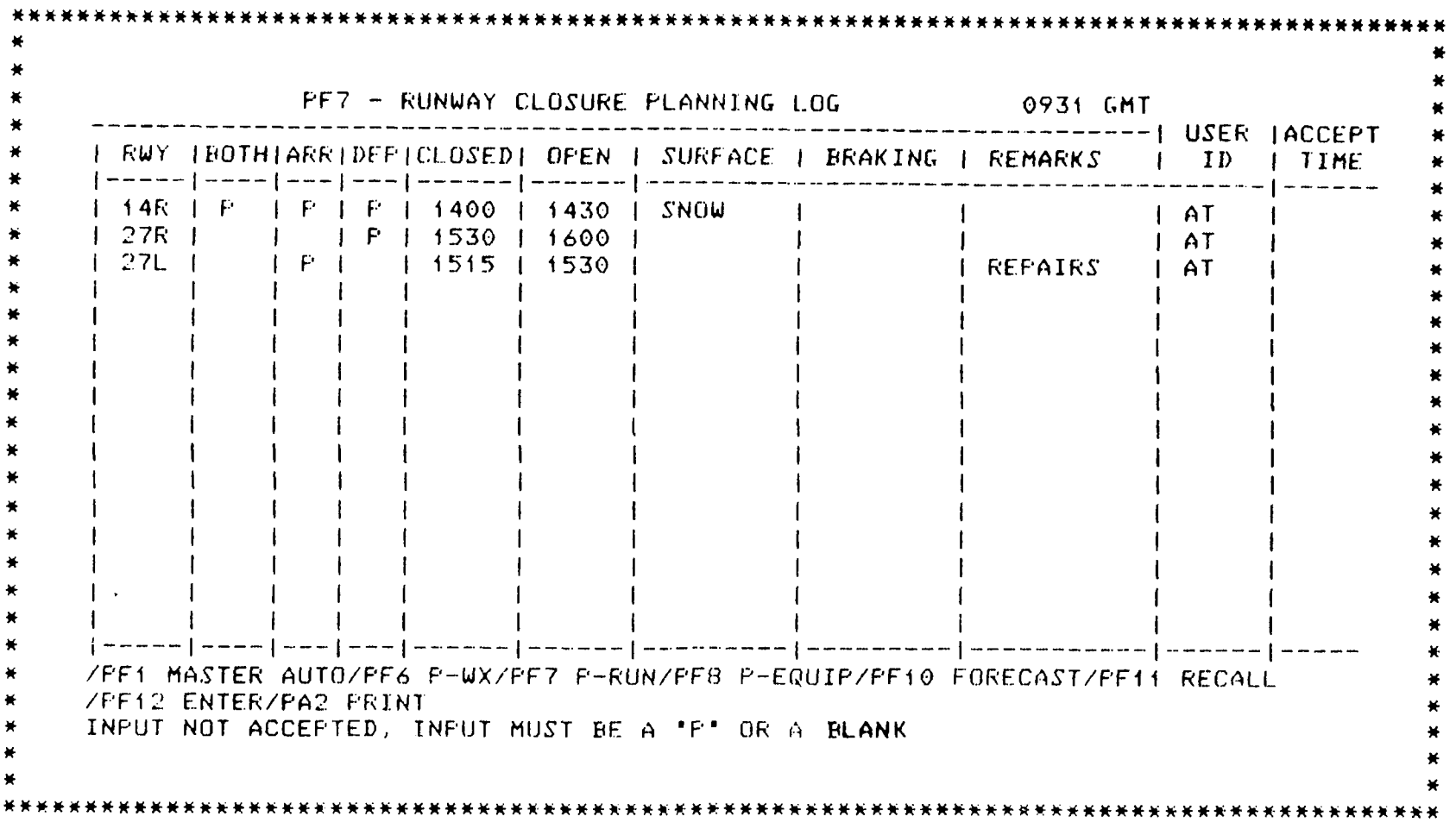
FIGURE 20. PF-10 PLANNING/FORECAST SELECTION PANEL

PF6 -- WEATHER PLANNING LOG 0901 GMT

START	END	CEIL	VIS	WIND	REMARKS	USER ID	ACCEPT TIME
1400	1600	5000	1-1/2	3515		AT	0836
1600	1800	7000	>7	2705	CLRING	AT	0836

/PF1 MASTER AUTO/PF6 P-WX/PF7 P-RUN/PF8 P-EQUIP/PF10 FORECAST/PF11 RECALL
/PF12 ENTER/PA2 PRINT
AT CONTROLS PLAN AT PLAN REJECTED 0905 USE PF11 TO RECALL REJ. PLAN

FIGURE 21. WEATHER PLANNING LOG (PF-6)



PF7 - RUNWAY CLOSURE PLANNING LOG 0931 GMT

RWY	BOTH	ARR	DEP	CLOSED	OPEN	SURFACE	BRAKING	REMARKS	USER ID	ACCEPT TIME
14R	P	P	P	1400	1430	SNOW			AT	
27R			P	1530	1600				AT	
27L		P		1515	1530			REPAIRS	AT	

/PF1 MASTER AUTO/PF6 P-WX/PF7 P-RUN/PF8 P-EQUIP/PF10 FORECAST/PF11 RECALL
/PF12 ENTER/PA2 PRINT
INPUT NOT ACCEPTED, INPUT MUST BE A "P" OR A BLANK

FIGURE 22. RUNWAY CLOSURE PLANNING LOG (PF-7)

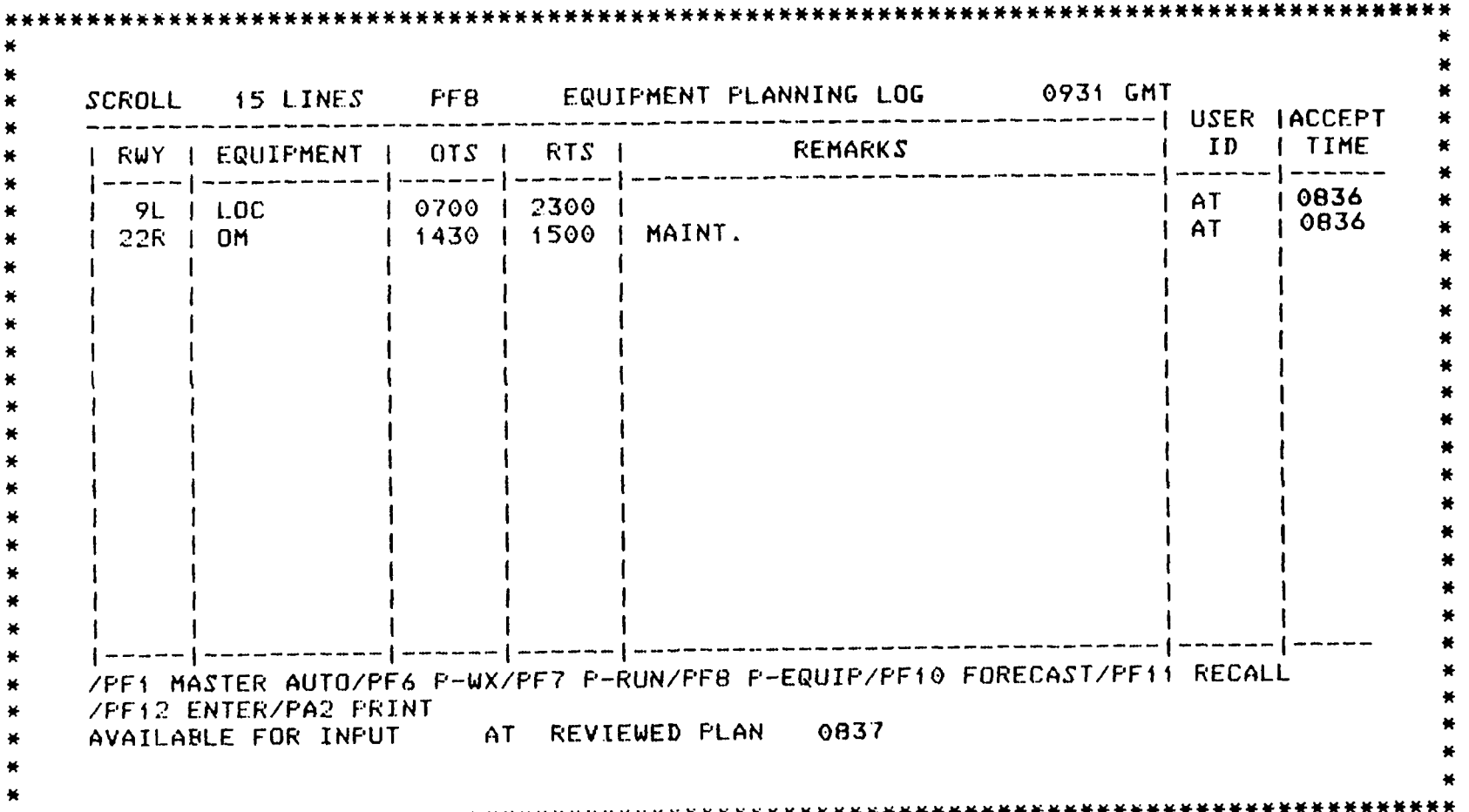


FIGURE 23. EQUIPMENT PLANNING LOG (PF-8)

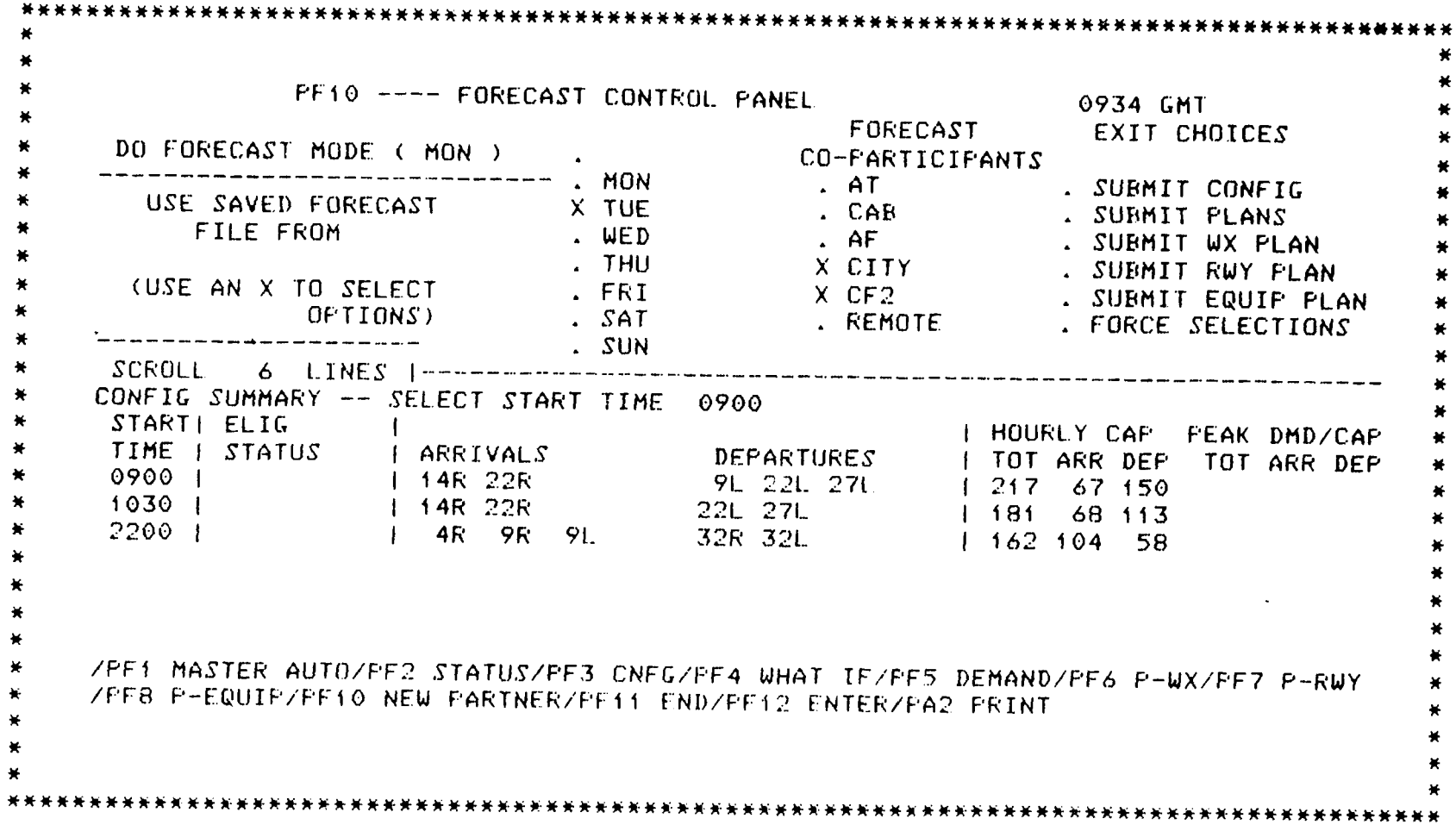


FIGURE 24. PF-10 FORECAST CONTROL PANEL

```
*****************************************************************************************
*                                                                                       *
*                                                                                       *
*          PF2 -- FORECAST STATUS PANEL      TIME SLOT 0900 TO 0915     |ARRIVAL MINS   *
*    RWY |LOC|GS |COM|OM |MM |IM |ALS| F |DME|RVR|HIR|CL |TDZ|CA/D|S/B | CEIL  VISIB   *
*    ----|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|-----------   *
*     4R | O | O | - | O | O | - | O | O | O | - |   | - | - |   |   | 4500  7       *
*     4L |   | - | - |   | - | - |   | - |   | - |   | - | - |   |   |  402  1       *
*     9R |   |   |   |   |   | - |   |   |   |   |   |   | - |   |   |  200 1800     *
*     9L | O | O | - | O | O | - |   |   |   |   |   | - | - | OO | SB |  200 1800     *
*    14R |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  200 1800     *
*    14L |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |  200 1800     *
*    22R |   |   | - |   |   | - |   |   |   | - |   | - | - |   |   |  200    1/2   *
*    22L | P | P | - | P | P | - | P | P | P | - | P | - | - |   |   |  200    1/2   *
*    27R |   |   |   |   |   | - |   |   |   |   |   | - | - |   |   |  200 1800     *
*    27L |   |   | - |   |   | - |   |   |   |   |   |   | - |   |   |  200 1800     *
*    32R |   |   |   |   |   | - |   |   |   |   |   |   |   |   |   |  200 1800     *
*    32L |   |   |   |   |   | - |   |   |   |   |   |   |   |   |   |  200 1800     *
*    14R CAT II          |14R R-MID              |UPS1                                *
*    14R CAT III         |14R R-ROLL             |UPS2                  WEATHER       *
*    14L CAT II          |14L R-MID              |UPS3                CEIL  VISIB     *
*    14L CAT III         |14L R-ROLL             |ENG1                >4500     >7    *
*                        |VOR                    |ENG2                                *
*                        |MIDFIELD DME           |ENG3                                *
*    /PF1 MASTER AUTO/PF2 STATUS/PF3 CNFG/PF4 WHAT IF/PF5 DEMAND/PF6 P-WX/PF7 P-RWY    *
*    /PF8 P-EQUIP/PF10 FORECAST/PF11 RECALL/PF12 ENTER/PA2 PRINT                       *
*    SCREEN UPDATED BY AT  0836 GMT                                                    *
*                                                                                       *
*                                                                                       *
*****************************************************************************************
```

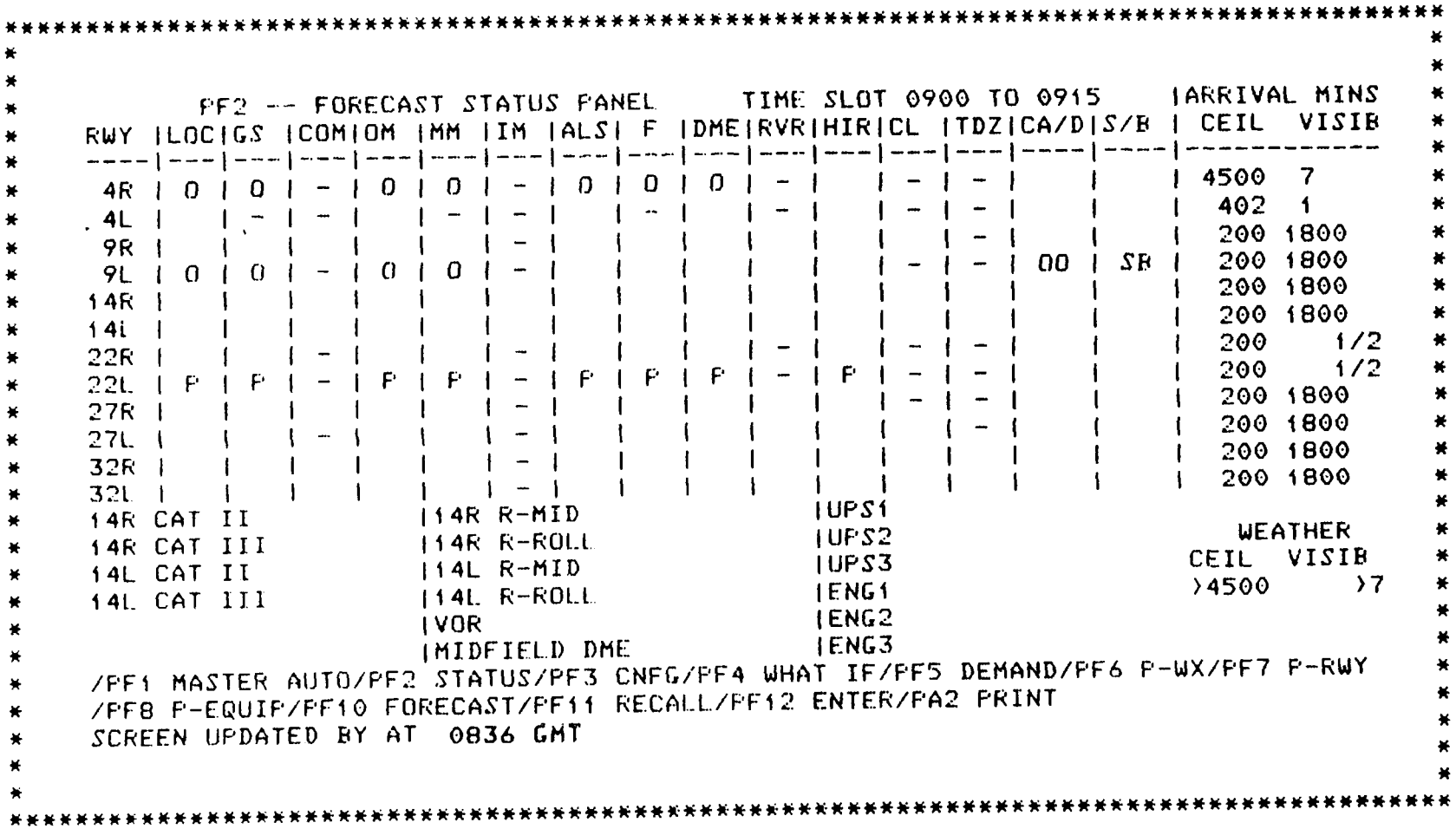


FIGURE 25. FORECAST STATUS PANEL (PF-2)

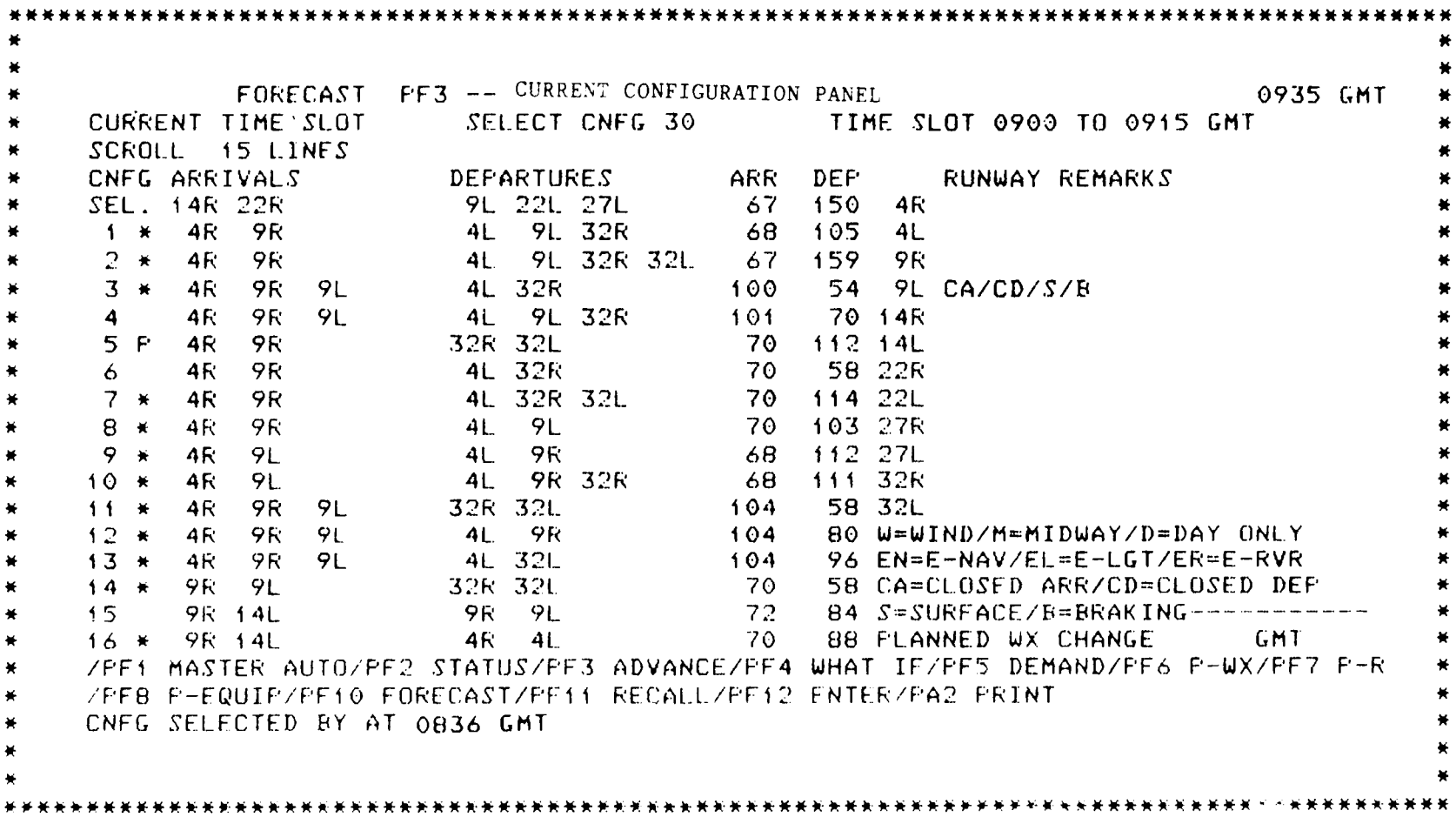


FIGURE 26. FORECAST CONFIGURATION PANEL (PF-3)

```
*****************************************************************************************
*                                                                                       *
*                                                                                       *
*                    FORECAST PF5 -- DEMAND PANEL     1200 GMT                          *
*              ARRIVALS  X/Y/Z X= TOTAL Y=HEAVY Z= LIGHT    DEPARTURES                  *
*     TIME     TOTAL     KUBBS     CGT       PLANO     FARMM    TOTAL     N     E     S     W  *
*   1200          25      3/1/1     1/ /1     1         20/10/10   25      5     5    10     5  *
*   1215          25      3/1/1     1/ /1     1         20/10/10   25      5     5    10     5  *
*   1230          25      3/1/1     1/ /1     1         20/10/10   25      5     5    10     5  *
*   1245          25      3/1/1     1/ /1     1         20/10/10   25      5     5    10     5  *
*   ------------------------------------------------------------------------------------  *
*   1200 1300    100     12/4/4     4/ /4     4         80/40/40  100     20    20    40    20  *
*   ------------------------------------------------------------------------------------  *
*   1300          25      3/1/1     1/ /1     1         20/10/10   25      5     5    10     5  *
*   1315          25      3/1/1     1/ /1     1         20/10/10   25      5     5    10     5  *
*   1330          25      3/1/1     1/ /1     1         20/10/10   25      5     5    10     5  *
*   1345          25      3/1/1     1/ /1     1         20/10/10   25      5     5    10     5  *
*   ------------------------------------------------------------------------------------  *
*   1300 1400    100     12/4/4     4/ /4     4         80/40/40  100     20    20    40    20  *
*   ------------------------------------------------------------------------------------  *
*   1400         100     12/4/4     4/ /4     4         80/40/40  100     20    20    40    20  *
*   1500         100     12/4/4     4/ /4     4         80/40/40  100     20    20    40    20  *
*   1600         100     12/4/4     4/ /4     4         80/40/40  100     20    20    40    20  *
*   1700         100     12/4/4     4/ /4     4         80/40/40  100     20    20    40    20  *
*   /PF1 MASTER AUTO/PF2 STATUS/PF3 CNFG/PF4 WHAT IF/PF5 DEMAND/PF6 P-WX/PF7 P-RWY      *
*   /PF8 P-EQUIP/PF10 FORECAST/NO RECALL/NO ENTER/PA2 PRINT                             *
*   SCREEN UPDATED BY CF  1200 GMT                                                      *
*                                                                                       *
*                                                                                       *
*****************************************************************************************
```

FIGURE 27. FORECAST DEMAND PANEL (PF-5)

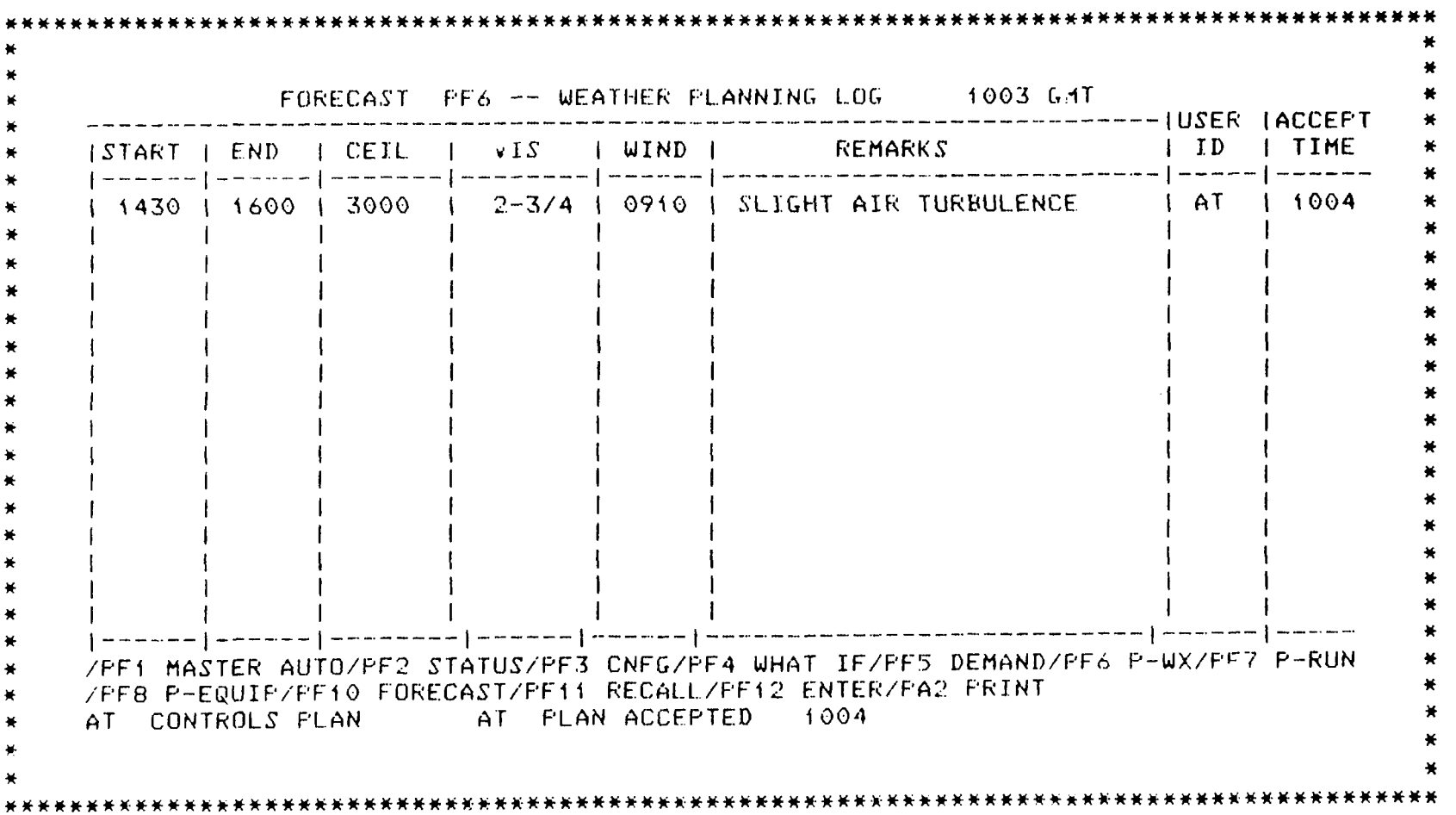


FIGURE 28. FORECAST WEATHER PLANNING LOG (PF-6)

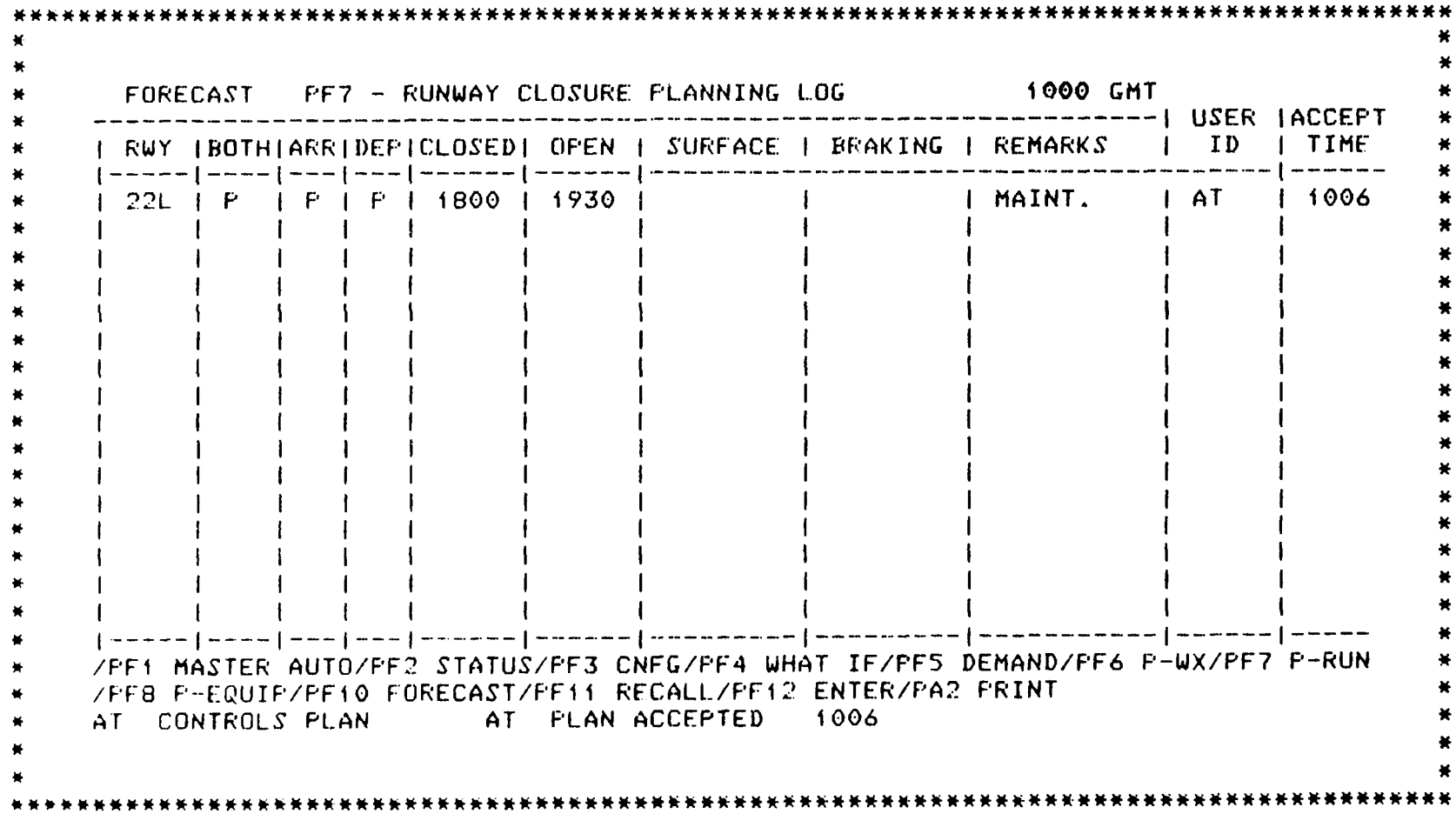


FIGURE 29. FORECAST RUNWAY CLOSURE PLANNING LOG (PF-7)

SCROLL 15 LINES FORECAST PF8 EQP PLANNING LOG 1007 GMT

RWY	EQUIPMENT	OTS	RTS	REMARKS	USER ID	ACCEPT TIME
9L	LOC	0700	2300		AT	1008
32L	OM	1400	1900	REPAIRS	AT	1008

/PF1 MASTER AUTO/PF2 STATUS/PF3 CNFG/PF4 WHAT IF/PF5 DEMAND/PF6 P-WX/PF7 P-RUN
/PF8 P-EQUIP/PF10 FORECAST/PF11 RECALL/PF12 ENTER/PA2 PRINT
AT CONTROLS PLAN AT PLAN ACCEPTED 1008

FIGURE 30. FORECAST EQUIPMENT PLANNING LOG (PF-8)

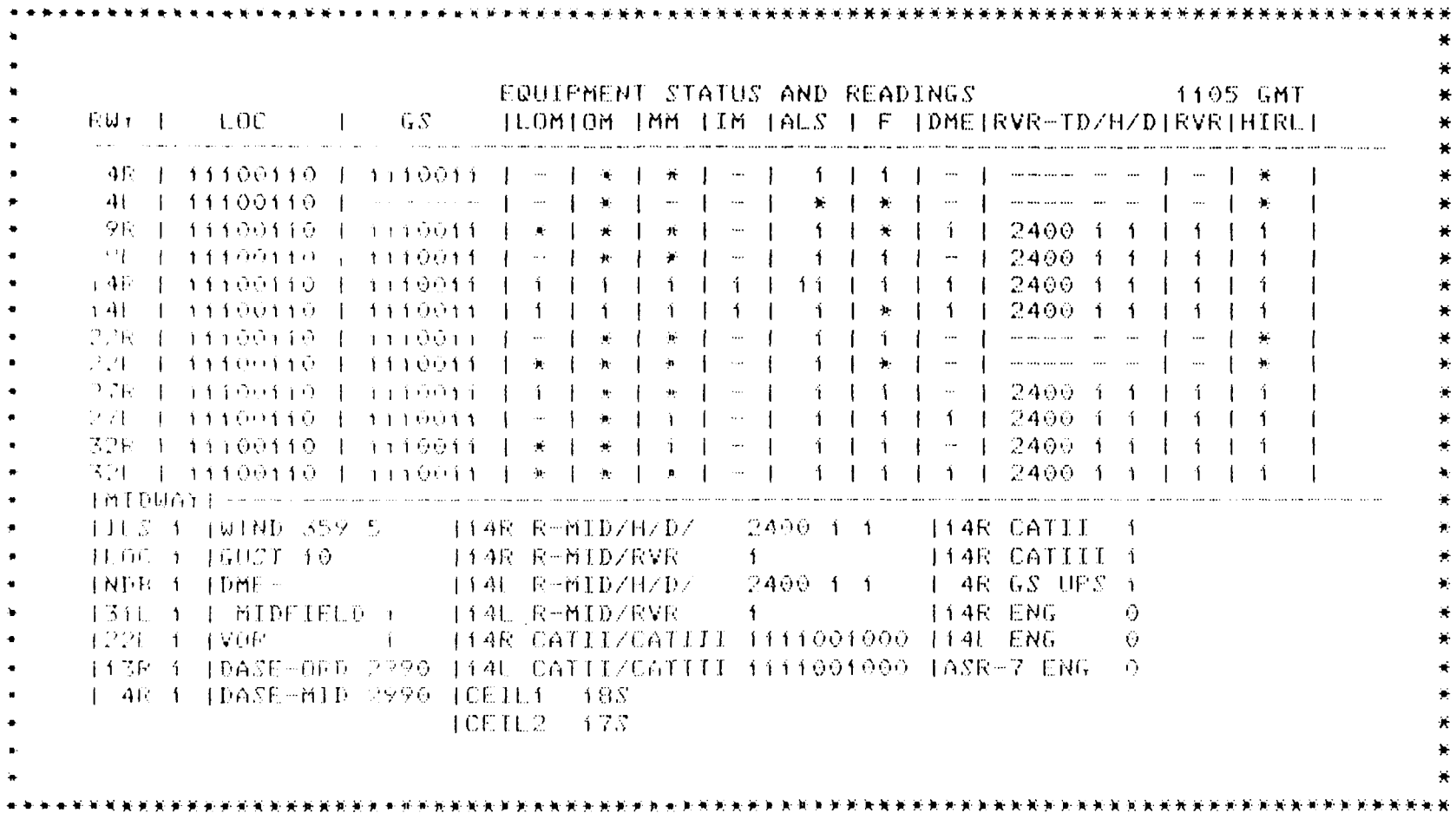


FIGURE 31. EQUIPMENT STATUS AND READING PANEL

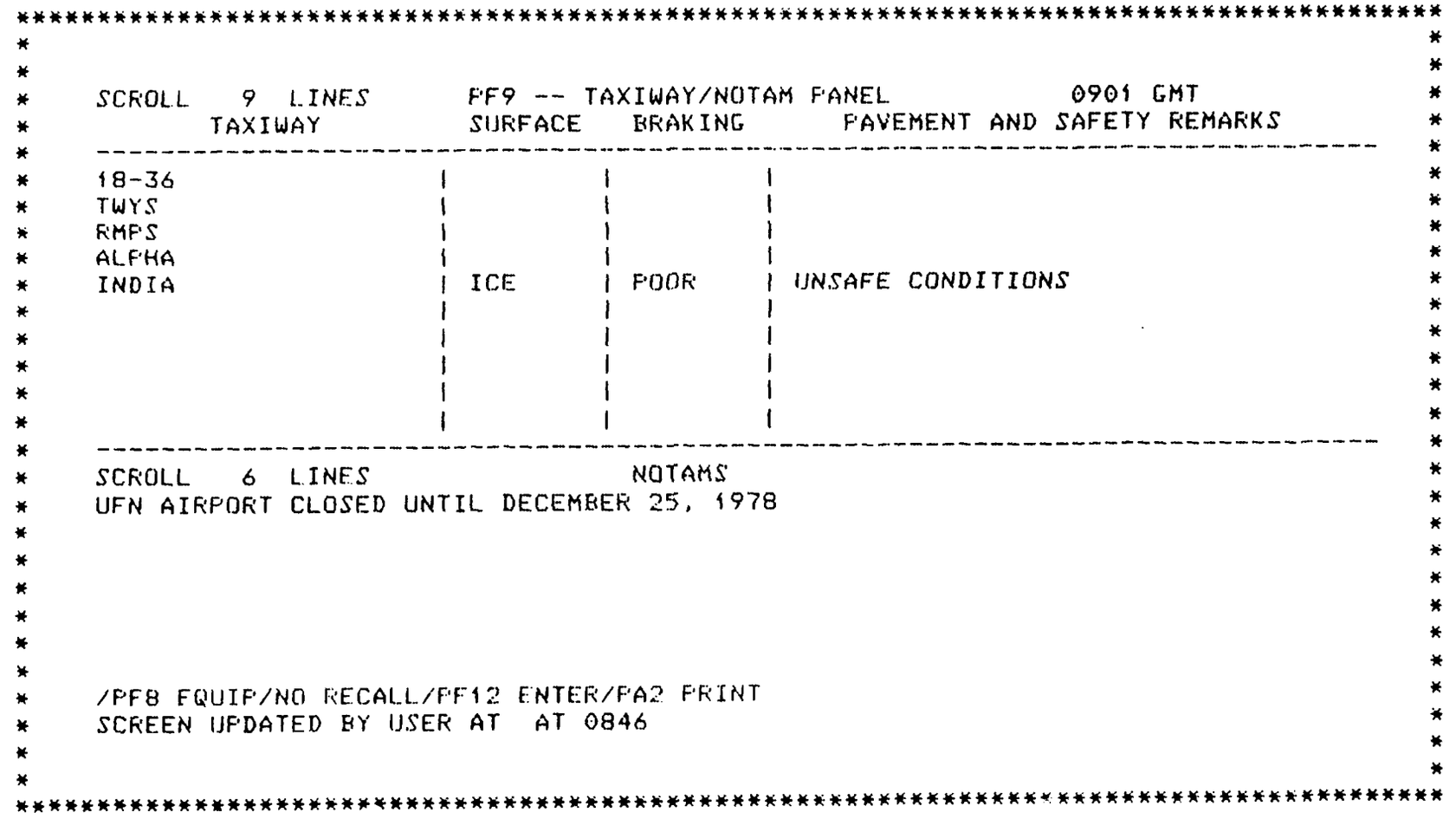


FIGURE 32. TAXIWAY/NOTAM PANEL

APPENDIX A

RCMS LIBRARY

```
LIBPDS          -
                                                                        MAS00220
 DCL 1 FELIG(96) LIKE ELTABLE STATIC EXTERNAL;/*FPF3-ELIG INFO-9-11-86*/MAS00230
/  /
                                                                        MAS00240
 DCL 1 FORCAST        STATIC EXTERNAL,  /*FORECAST INFO     --   9-11-86*/MAS00250
       2 STARTQH        FIXED BIN(15),                  /*START QTR HR*/MAS00260
       2 MSG            CHAR(79);                                      MAS00270
/  /
                                                                        MAS00220
 DCL 1 FSURF      LIKE SURF     STATIC EXTERNAL;/*FPF7-SURF INFO-9-16-86*/MAS00230
/  /
                                                                        MAS00220
 DCL 1 FRWYEQP    LIKE RWYEQP   STATIC EXTERNAL;/*FPF8-REQP INFO-9-16-86*/MAS00230
/  /
                                                                        CAB00010
 DCL 1 CABVIS,                              /*CAB VISIBILITIES -- 7-28-86*/CAB00020
       2 DISPLAY(25)          CHAR(6)          INIT                     CAB00030
         ('     )7',' 4',' 3',' 2-3/4',' 2-1/2',' 2-1/4',               CAB00040
          ' 2',' 1-7/8',' 1-3/4',' 1-5/8',' 1-1/2',' 1-3/8',           CAB00050
          ' 1-1/4',' 1-1/8',' 1',' 7/8',' 3/4',' 5/8',                 CAB00060
          ' 1/2',' 3/8',' 5/16',' 1/4',' 3/16',' 1/8',                 CAB00070
          ' 1/16'),                                                    CAB00080
       2 VALUE(25)            BIN FLOAT(21)    INIT                    CAB00090
         ( 36961., 21120., 15840., 14520., 13200., 11880.,            CAB00100
           10560.,  9900.,  9240.,  8580.,  7920.,  7260.,            CAB00110
            6600.,  5940.,  5280.,  4620.,  3960.,  3300.,            CAB00120
            2640.,  1980.,  1650.,  1320.,   990.,   660.,            CAB00130
             330.);                                                    CAB00140
/  /
                                                                        JUN00010
 DCL MAXCNFG FIXED BIN(15) INIT(62); /*MAX # CONFIG IN CNFGRQ--7-14-86*/JUN00020
/  /
                                                                        JUN00030
 DCL RWYNAME(12) CHAR(3)                    /*RUNWAY NAMES -- 7-14-86*/JUN00040
     INIT (' 4R', ' 4L', ' 9R', ' 9L', '14R', '14L',                    JUN00050
           '22R', '22L', '27R', '27L', '32R', '32L');                   JUN00060
/  /
                                                                        RWY00010
    DCL  1  RWYMIN (12)          STATIC     EXTERNAL,/*ARR MINS--10-85*/RWY00020
             2  CATIII,\                                 /* CAT III */RWY00030
                3  NONE,\                               /* NONE OTS */RWY00040
                   4  CEIL       BIN FLOAT (21),                      RWY00050
                   4  VIS        BIN FLOAT (21),                      RWY00060
             2  CATII,                                    /* CAT II */RWY00070
                3  NONE,                                 /* NONE OTS */RWY00080
                   4  CEIL       BIN FLOAT (21),                      RWY00090
                   4  VIS        BIN FLOAT (21),                      RWY00100
                3  RVRMID,                        /* RVR MIDPOINT OTS */ RWY00110
                   4  CEIL       BIN FLOAT (21),                      RWY00120
                   4  VIS        BIN FLOAT (21),                      RWY00130
                3  RVRMR,\          /* RVR MIDPOINT & RVR ROLLOUT OTS */ RWY00140
                   4  CEIL       BIN FLOAT (21),                      RWY00150
                   4  VIS        BIN FLOAT (21),                      RWY00160
                3  IM1,                          /* INNER MARKER 1 OTS */ RWY00170
```

```
            4 CEIL        BIN FLOAT (21),                          RWY00180
            4 VIS         BIN FLOAT (21),                          RWY00190
         3 IM2,                          /* INNER MARKER 2 OTS */ RWY00200
            4 CEIL        BIN FLOAT (21),                          RWY00210
            4 VIS         BIN FLOAT (21),                          RWY00220
                                                                   RWY00230
      2 CATI,                                        /* CAT I */RWY00240
         3 NONE,                                   /* NONE OTS */RWY00250
            4 CEIL        BIN FLOAT (21),                          RWY00260
            4 VIS         BIN FLOAT (21),                          RWY00270
         3 GS,                               /* GLIDE SLOPE OTS */RWY00280
            4 CEIL        BIN FLOAT (21),                          RWY00290
            4 VIS         BIN FLOAT (21),                          RWY00300
         3 TDZL,                    /* TOUCHDOWN ZONE LIGHTS OTS */RWY00310
            4 CEIL        BIN FLOAT (21),                          RWY00320
            4 VIS         BIN FLOAT (21),                          RWY00330
         3 RCLS,                    /* RWY CENTERLINE LIGHTS OTS */RWY00340
            4 CEIL        BIN FLOAT (21),                          RWY00350
            4 VIS         BIN FLOAT (21),                          RWY00360
         3 ALS,                                    /* ALS OTS */RWY00370
            4 CEIL        BIN FLOAT (21),                          RWY00380
            4 VIS         BIN FLOAT (21),                          RWY00390
         3 FLASHER,                             /* FLASHERS OTS */RWY00400
            4 CEIL        BIN FLOAT (21),                          RWY00410
            4 VIS         BIN FLOAT (21),                          RWY00420
         3 OM,                               /* OUTER MARKER OTS */RWY00430
            4 CEIL        BIN FLOAT (21),                          RWY00440
            4 VIS         BIN FLOAT (21),                          RWY00450
         3 MM,                              /* MIDDLE MARKER OTS */RWY00460
            4 CEIL        BIN FLOAT (21),                          RWY00470
            4 VIS         BIN FLOAT (21),                          RWY00480
         3 RVRTD,                           /* RVR TOUCHDOWN OTS */RWY00490
            4 CEIL        BIN FLOAT (21),                          RWY00500
            4 VIS         BIN FLOAT (21),                          RWY00510
                                                                   RWY00520
      2 LOC,                                        /* LOCALIZER */RWY00530
         3 NONE,                                    /* NONE OTS */RWY00540
            4 CEIL        BIN FLOAT (21),                          RWY00550
            4 VIS         BIN FLOAT (21),                          RWY00560
         3 ALS,                          /* LOCALIZER & ALS OTS */RWY00570
            4 CEIL        BIN FLOAT (21),                          RWY00580
            4 VIS         BIN FLOAT (21),                          RWY00590
                                                                   RWY00600
      2 VOR,                                          /* VOR */RWY00610
         3 NONE,                                   /* NONE OTS */RWY00620
            4 CEIL        BIN FLOAT (21),                          RWY00630
            4 VIS         BIN FLOAT (21),                          RWY00640
         3 ALS,                                /* VOR & ALS OTS */RWY00650
            4 CEIL        BIN FLOAT (21),                          RWY00660
            4 VIS         BIN FLOAT (21),                          RWY00670
         3 FLASHER,                         /* VOR & FLASHER OTS */RWY00680
            4 CEIL        BIN FLOAT (21),                          RWY00690
            4 VIS         BIN FLOAT (21),                          RWY00700
                                                                   RWY00710
      2 NDB,                          /* NON-DIRECTIONAL BEACON */RWY00720
```

```
            3 NONE,                                          /* NONE OTS */RWY00730
              4 CEIL        BIN FLOAT (21),                                 RWY00740
              4 VIS         BIN FLOAT (21),                                 RWY00750
            3 RAIL,                                          /* RAIL OTS */RWY00760
              4 CEIL        BIN FLOAT (21),                                 RWY00770
              4 VIS         BIN FLOAT (21),                                 RWY00780
            3 ALS,                                            /* ALS OTS */RWY00790
              4 CEIL        BIN FLOAT (21),                                 RWY00800
              4 VIS         BIN FLOAT (21),                                 RWY00810
            3 RAD_DME,                                  /* RADAR DME OTS */RWY00820
              4 CEIL        BIN FLOAT (21),                                 RWY00830
              4 VIS         BIN FLOAT (21);                                 RWY00840
/ /
                                                                            MOD00280
 /* BLANK=NO PLAN, 'TEST'=PLAN IN TEST, 'PLAN'=PREVIOUSLY ACCEPTED PLN*/MOD00290
 /*                                          OR PLAN FORCED BY USER */
  DCL  1  PSTATUS               STATIC EXTERNAL,          /*7-16-86*/MOD00300
          2  ANYPLAN             CHAR(4),                              MOD00310
          2  CFLOG               CHAR(4),                              MOD00320
          2  WXLOG               CHAR(4),                              MOD00320
          2  CLSLOG              CHAR(4),                              MOD00330
          2  EQPLOG              CHAR(4);                              MOD00340
/ /
                                                                        PLA00010
  DCL 1 PLAN (96)          STATIC EXTERNAL, /*PLANNED FLAGS --  8-01-86*/PLA00020
          2 WX,                                                         PLA00030
            3 DIR       BIN FLOAT(21),                                  PLA00040
            3 SPD       BIN FLOAT(21),                                  PLA00050
            3 CEIL      BIN FLOAT(21),                                  PLA00060
            3 VIS       BIN FLOAT(21),                                  PLA00070
          2 RUNWAY(12),                                                 PLA00080
            3 TWRCLOS,                                                  PLA00090
              4 ARR     CHAR(1),                                        PLA00100
              4 DEP     CHAR(1),                                        PLA00110
            3 SURF      CHAR(5),                                        PLA00120
            3 BRAK      CHAR(5),                                        PLA00130
            3 LOC       CHAR(1),                                        PLA00140
            3 GS        CHAR(1),                                        PLA00150
            3 COM       CHAR(1),                                        PLA00160
            3 OM        CHAR(1),                                        PLA00170
            3 MM        CHAR(1),                                        PLA00180
            3 IM        CHAR(1),                                        PLA00190
            3 ALS       CHAR(1),                                        PLA00200
            3 FLASHER   CHAR(1),                                        PLA00210
            3 DME       CHAR(1),                                        PLA00220
            3 RVR       CHAR(1),                  /*  TOUCHDOWN RVR   */PLA00230
            3 RVRMID    CHAR(1),  /*INDIVIDUAL RVR -- MID POINT       */PLA00240
            3 RVRROLL   CHAR(1),  /*INDIVIDUAL RVR -- ROLL OUT        */PLA00250
            3 HIRL      CHAR(1),                                        PLA00260
            3 CL        CHAR(1),                                        PLA00270
            3 TDZ       CHAR(1);                                        PLA00280
/ /
                                                                        APT00010
    DCL 1 APTSTAT(96) STATIC EXTERNAL,     /*AIRPORT STATUS -- 7-09-86*/APT00020
          2 ACTUAL,                                                     APT00030
```

```
          3 DIR        BIN FLOAT(21),                                    APT00040
          3 SPD        BIN FLOAT(21),                                    APT00050
          3 CEIL       BIN FLOAT(21),                                    APT00060
          3 VIS        BIN FLOAT(21),                                    APT00070
        2 RUNWAY(12),                                                    APT00080
          3 TWRCLOS,                                                     APT00090
            4 ARR      CHAR(1),                                          APT00100
            4 DEP      CHAR(1),                                          APT00110
          3 SURF       CHAR(5),                                          APT00120
          3 BRAK       CHAR(5);                                          APT00130
/ /
                                                                         MAS00500
    DCL 1 PEQUIP(96) STATIC,EXTERNAL,  /*EQUIPMENT STATUS -- 7-03-86*/   MAS00510
          2 RUNWAY(12),                                                  MAS00520
            3 CATII    CHAR(1),  /*Y=IN SER,N=NOT AVAIL,' '=AVAILABLE*/MAS00530
            3 CATIII   CHAR(1),  /*Y=IN SER,N=NOT AVAIL,' '=AVAILABLE*/MAS00540
            3 LOC      CHAR(1),                                        MAS00550
            3 GS       CHAR(1),                                        MAS00560
            3 COM      CHAR(1),                                        MAS00570
            3 OM       CHAR(1),                                        MAS00580
            3 MM       CHAR(1),                                        MAS00590
            3 IM       CHAR(1),                                        MAS0060
            3 ALS      CHAR(1),                                        MAS0061
            3 FLASHER  CHAR(1),                                        MAS0062
            3 DME      CHAR(1),                                        MAS00630
            3 RVR      CHAR(1),                  /*  TOUCHDOWN RVR   */MAS00640
            3 RVRMID   CHAR(1),  /*INDIVIDUAL RVR -- MID POINT       */MAS00650
            3 RVRROLL  CHAR(1),  /*INDIVIDUAL RVR -- ROLL OUT        */MAS00660
            3 HIRL     CHAR(1),                                        MAS00670
            3 CL       CHAR(1),                                        MAS00680
            3 TDZ      CHAR(1),                                        MAS00690
            3 CONVERT,                                                 MAS00700
              4 CEILMIN  BIN FLOAT(21),                                MAS00710
              4 VISMIN   BIN FLOAT(21),                                MAS00720
          2 VOR        CHAR(1),                                        MAS00730
          2 MID_DME    CHAR(1),                                        MAS00740
          2 UPS(3)     CHAR(1),                                        MAS00750
          2 ENG(3)     CHAR(1),                                        MAS00760
/ /
                                                                         STA00010
    DCL 1 STATUS CONNECTED,/*AIRPORT STATUS -- LIKE APTSTAT -- 7-09-86*/STA00020
          2 ACTUAL,                                                      STA00030
            3 DIR      BIN FLOAT(21),                                  STA00040
            3 SPD      BIN FLOAT(21),                                  STA00050
            3 CEIL     BIN FLOAT(21),                                  STA00060
            3 VIS      BIN FLOAT(21),                                  STA00070
          2 RUNWAY(12),                                                  STA00080
            3 TWRCLOS,                                                   STA00090
              4 ARR    CHAR(1),                                        STA00100
              4 DEP    CHAR(1),                                        STA00110
            3 SURF     CHAR(5),                                        STA00120
            3 BRAK     CHAR(5),                                        STA00130
/ /
                                                                         EQU00010
    DCL 1 EQUIP CONNECTED, /*EQUIPMENT STATUS -- LIKE PEQUIP-- 7-03-86*/EQU00020
```

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          2 RUNWAY(12),                                                    EQU00030
            3 CATII      CHAR(1),  /*Y=IN SER,N=NOT AVAIL.,' '=AVAILABLE*/EQU00040
            3 CATIII     CHAR(1),  /*Y=IN SER,N=NOT AVAIL.,' '=AVAILABLE*/EQU00050
            3 LOC        CHAR(1),                                          EQU00060
            3 GS         CHAR(1),                                          EQU00070
            3 COM        CHAR(1),                                          EQU00080
            3 OM         CHAR(1),                                          EQU00090
            3 MM         CHAR(1),                                          EQU00100
            3 IM         CHAR(1),                                          EQU00110
            3 ALS        CHAR(1),                                          EQU00120
            3 FLASHER    CHAR(1),                                          EQU00130
            3 DME        CHAR(1),                                          EQU00140
            3 RVR        CHAR(1),                  /*  TOUCHDOWN RVR    */EQU00150
            3 RVRMID     CHAR(1),  /*INDIVIDUAL RVR -- MID POINT        */EQU00160
            3 RVRROLL    CHAR(1),  /*INDIVIDUAL RVR -- ROLL OUT         */EQU00170
            3 MIRL       CHAR(1),                                          EQU00180
            3 CL         CHAR(1),                                          EQU00190
            3 TDZ        CHAR(1),                                          EQU00200
            3 CONVERT,                                                     EQU00210
              4 CEILMIN   BIN FLOAT(21),                                   EQU00220
              4 VISMIN    BIN FLOAT(21),                                   EQU00230
          2 VOR          CHAR(1),                                          EQU00240
          2 MID_DME      CHAR(1),                                          EQU00250
          2 UPS(3)       CHAR(1),                                          EQU00260
          2 ENG(3)       CHAR(1);                                          EQU00270
/ /
                                                                           MAS02020
    DCL 1 CNFG CONNECTED, /*CONFIG INFO -- LIKE CONFIG(PF3) -- 7-14-86*/   MAS02030
          2 ACCTIME      CHAR(4),      /*ACCEPT TIME OF CONFIG CHANGE */   MAS02040
          2 CONFIND      FIXED BIN(15), /*CONFIG NUM FOR QTR HR*/          MAS02050
          2 FORCE        CHAR(1),    /*FORCED CONFIG CHANGE Y=YES,N=NO*/   MAS02060
          2 REASON,                      /*' '=NO   AND  '*'=YES*/       MAS02070
            3 NOISE      CHAR(1),                                          MAS02080
            3 MAINT      CHAR(1),                                          MAS02090
            3 STAFF      CHAR(1),                                          MAS02100
            3 DEMAND     CHAR(1),                                          MAS02110
            3 OTHER      CHAR(1),                                          MAS02120
          2 MID_13R      CHAR(1);        /*MIDWAY FLAG -- 5-20-85*/        MAS02130
/ /
                                                                           MAS02140
    DCL 1 ELIGIB CONNECTED,/*ELIGIB INFO--LIKE ELTABLE(PF3) -- 7-14-86*/   MAS02150
          2 PW_TIME      CHAR(4),       /*' '=NO CHANGE, ELSE USE TIME*/  MAS02160
          2 ELIG,                                                          MAS02170
            3 CNT        FIXED BIN(15),                                    MAS02180
            3 ID         BIT(80),                                          MAS02190
          2 NOTELIG,                                                       MAS02200
            3 WX         BIT(80),                                          MAS02210
            3 RWYCLOS    BIT(80),                                          MAS02220
            3 SRFBRAK    BIT(80),                                          MAS02230
          2 WINDCND      BIT(80),                                          MAS02240
          2 RWYRMK(12)   CHAR(26);                                         MAS02250
/ /
                                                                           MAS01220
    DCL 1 MPANEL STATIC EXTERNAL, /*PF2 -- MASTER PANEL -- 7-03-86*/       MAS01230
          2 NOTEPAD(3)  CHAR(30), /*FOR USER GENERATED NOTES       */      MAS01240
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START OF MASTER DATA BASE

```
          2 ACT_WX,                 /*ACTUAL WEATHER -- FOR TRIGGERS*/     MAS01250
            3 DIR         CHAR(3),  /*VIA LLWAS*/                          MAS01260
            3 SPD         CHAR(2),  /*VIA LLWAS*/                          MAS01270
            3 CEIL        CHAR(8),  /*VIA CEILOMETER -- AAANNNNN*/         MAS01280
          2 RWYMSG(12)    CHAR(79), /*COMPOSITE RWY MSG*/                  MAS01290
          2 MSG           CHAR(79);                                        MAS01300
          /*REST OF PF2 DATA IS TAKEN FROM OTHER PANELS*/                  MAS01310
          /*PF3 -- CONFIG, ELIGIB */                                       MAS01320
          /*PF5 -- DEMAND*/                                                MAS01330
          /*PF6 -- WEATHER -- CURRENT, FORECAST*/                          MAS01340
          /*PF8 -- MINIMA CEILING, VISIBILITY, RVR*/                       MAS01350
          /*NOTE -- WIND DIRECTION -- SCREEN PGMS CONVERT IT TO 2 CHAR*/   MAS01360
/ /
                                                                           MAS01430
    DCL 1 CONFIG(96) STATIC EXTERNAL,  /*PF3 -- CONFIG INFO -- 7-03-86*/  MAS01440
          2 ACCTIME     CHAR(4),       /*ACCEPT TIME OF CONFIG CHANGE */  MAS01450
          2 CONFIND     FIXED BIN(15), /*CONFIG NUM FOR QTR HR*/          MAS01460
          2 FORCE       CHAR(1),    /*FORCED CONFIG CHANGE Y=YES,N=NO*/   MAS01470
          2 REASON,                    /*' '=NO   AND  '*'=YES*/         MAS01480
            3 NOISE     CHAR(1),                                         MAS01490
            3 MAINT     CHAR(1),                                         MAS01500
            3 STAFF     CHAR(1),                                         MAS01510
            3 DEMAND    CHAR(1),                                         MAS01520
            3 OTHER     CHAR(1),                                         MAS01530
          2 MID_13R     CHAR(1);       /*MIDWAY FLAG -- 5-20-85*/         MAS01540
/ /
                                                                           MAS01550
    DCL 1 ELTABLE(9) STATIC EXTERNAL, /*PF3 -- ELIGIB INFO -- 7-03-86*/    MAS01560
          2 PW_TIME     CHAR(4),       /*' '=NO CHANGE, ELSE USE TIME*/   MAS01570
          2 ELIG,                                                          MAS01580
            3 CNT       FIXED BIN(15),                                   MAS01590
            3 ID        BIT(80),                                         MAS01600
          2 NOTELIG,                                                       MAS01610
            3 WX        BIT(80),                                         MAS01620
            3 RWYCLOS   BIT(80),                                         MAS01630
            3 SRFBRAK   BIT(80),                                         MAS01640
          2 WINDCND     BIT(80),                                         MAS01650
          2 RWYRMK(12)  CHAR(26);                                        MAS01660
/ /
                                                                           MAS01670
    DCL 1 MESSAGE STATIC EXTERNAL, /*PF4 -- MESSAGE PANEL -- 5-18-85*/     MAS01680
          2 AT_ADV,                                                        MAS01690
            3 COUNT     BIN FLOAT(21),                                   MAS01700
            3 TABLE(20) CHAR(79),                                        MAS01710
          2 CAB_ADV,                                                       MAS01720
            3 COUNT     BIN FLOAT(21),                                   MAS01730
            3 TABLE(20) CHAR(79),                                        MAS01740
          2 CURRENT,                                                       MAS01750
            3 COUNT     BIN FLOAT(21),                                   MAS01760
            3 TABLE(60) CHAR(79),                                        MAS01770
          2 MSG         CHAR(79);                                        MAS01780
/ /
                                                                           MAS01790
    DCL 1 DEMAND STATIC EXTERNAL, /*PF5 -- DEMAND PANEL -- 7-03-86*/       MAS01800
          2 TABLE(14),                                                     MAS01810
```

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          3 TIME,                                                    MAS01820
            4 START      CHAR(4),                                    MAS01830
            4 END        CHAR(4),                                    MAS01840
          3 ARR,                                                     MAS01850
            4 TOTAL      CHAR(3),                                    MAS01860
            4 KUBBS(3)   CHAR(2),                                    MAS01870
            4 CGT(3)     CHAR(2),                                    MAS01880
            4 PLANO(3)   CHAR(2),                                    MAS01890
            4 FARMM(3)   CHAR(2),                                    MAS01900
          3 DEP,                                                     MAS01910
            4 TOTAL      CHAR(3),                                    MAS01920
            4 NORTH      CHAR(2),                                    MAS01930
            4 EAST       CHAR(2),                                    MAS01940
            4 SOUTH      CHAR(2),                                    MAS01950
            4 WEST       CHAR(2),                                    MAS01960
        2 MSG            CHAR(79);                                   MAS01970
/ /
                                                                     MAS01980
    DCL 1 WEATHER STATIC EXTERNAL, /*PF6 -- WEATHER PANEL -- 7-03-86*/ MAS01990
        2 CURRENT,                                                   MAS02000
          3 TIME       CHAR(4),                                    MAS02010
          3 SKY        CHAR(2),                                    MAS02020
          3 CEIL(3)    CHAR(8),                                    MAS02030
          3 VIS        CHAR(10),                                   MAS02040
          3 ATMOS      CHAR(12),                                   MAS02050
          3 BAROM      CHAR(3),                                    MAS02060
          3 TEMP       CHAR(3),                                    MAS02070
          3 DEW        CHAR(3),                                    MAS02080
          3 WIND,                 /*SCREEN PGM CONVERTS DIR TO 2 CHAR*/MAS02090
            4 DIR      CHAR(3),                                    MAS02100
            4 SPD      CHAR(2),                                    MAS02110
          3 ALTIM      CHAR(4),                                    MAS02120
          3 OTHER      CHAR(12),                                   MAS02130
        2 CWX          CHAR(79),                                   MAS02140
        2 FORCAST,              /*LIKE WEATHER.CURRENT*/            MAS02150
          3 TIME       CHAR(4),                                    MAS02160
          3 SKY        CHAR(2),                                    MAS02170
          3 CEIL(3)    CHAR(8),                                    MAS02180
          3 VIS        CHAR(10),                                   MAS02190
          3 ATMOS      CHAR(12),                                   MAS02200
          3 BAROM      CHAR(3),                                    MAS02210
          3 TEMP       CHAR(3),                                    MAS02220
          3 DEW        CHAR(3),                                    MAS02230
          3 WIND,                 /*SCREEN PGM CONVERTS DIR TO 2 CHAR*/MAS02240
            4 DIR      CHAR(3),                                    MAS02250
            4 SPD      CHAR(2),                                    MAS02260
          3 ALTIM      CHAR(4),                                    MAS02270
          3 OTHER      CHAR(12),                                   MAS02280
        2 FWX          CHAR(60),                                   MAS02290
        2 CAB,                                                       MAS02300
          3 VIS        CHAR(6),    /*IN MILES*/                    MAS02310
          3 CEIL       CHAR(5),                                    MAS02320
        2 PW_CHANGE(3),                    /*PLANNED WX CHANGE */MAS02330
          3 TIME       CHAR(4),                                    MAS02340
          3 NAME       CHAR(4),            /*CEIL, VIS, WIND   */MAS02350
```

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          3 VALUE      CHAR(6),       /*NOTE -- WIND SPD/DIR = 4 CHAR*/MAS02360
        2 MSG          CHAR(79),                                      MAS02370
/ /
                                                                      MAS02380
    DCL 1 ADDWX STATIC EXTERNAL,     /*PF6 -- ADDED WX PANEL -- 7-03-86*/MAS02390
        2 RWY(12),                                                    MAS02400
          3 RVR(3)     CHAR(4),                                       MAS02410
        2 DAS_ORD      CHAR(4),                                       MAS02420
        2 DAS_MID      CHAR(4),                                       MAS02430
        2 MSG          CHAR(79),                                      MAS02440
/ /
                                                                      MAS02450
    DCL 1 SURF STATIC EXTERNAL,      /*PF7 -- RWY COND PANEL -- 7-03-86*/ MAS02460
        2 RUNWAY(13),                /*RUNWAY(13) = ALL*/            MAS02470
          3 ARR        CHAR(1),                                       MAS02480
          3 DEP        CHAR(1),                                       MAS02490
          3 SURF       CHAR(5),                                       MAS02500
          3 BRAK       CHAR(5),                                       MAS02510
          3 REMARKS    CHAR(40),                                      MAS02520
        2 SURFMSG(36)  CHAR(79),                                      MAS02530
        2 MSG          CHAR(79);                                      MAS02540
/ /
                                                                      MAS02550
    DCL 1 TAXIWAY STATIC EXTERNAL, /*PF7B -- TAXIWAY PANEL -- 7-03-86*/ MAS02560
        2 ZONE(37),                                                   MAS02570
          3 TWY        CHAR(20),                                      MAS02580
          3 SURF       CHAR(5),                                       MAS02590
          3 BRAK       CHAR(5),                                       MAS02600
          3 REMARKS    CHAR(36),                                      MAS02610
        2 NOTAM(25)    CHAR(49),                                      MAS02620
        2 MSG          CHAR(79),                                      MAS02630
/ /
                                                                      MAS02640
    DCL 1 RWYEQP STATIC EXTERNAL,        /*PF8 -- EQUIP PANEL -- 7-03-86*/MAS02650
        2 RUNWAY(12),                                                 MAS02660
          3 CATII      CHAR(1),  /*Y=IN SER,N=NOT AVAIL,' '=AVAILABLE*/MAS02670
          3 CATIII     CHAR(1),  /*Y=IN SER,N=NOT AVAIL,' '=AVAILABLE*/MAS02680
          3 LOC        CHAR(1),                                       MAS02690
          3 GS         CHAR(1),                                       MAS02700
          3 COM        CHAR(1),                                       MAS02710
          3 OM         CHAR(1),                                       MAS02720
          3 MM         CHAR(1),                                       MAS02730
          3 IM         CHAR(1),                                       MAS02740
          3 ALS        CHAR(1),                                       MAS02750
          3 FLASHER    CHAR(1),                                       MAS02760
          3 DME        CHAR(1),                                       MAS02770
          3 RVR        CHAR(1),                  /*  TOUCHDOWN RVR   */MAS02780
          3 RVRMID     CHAR(1),  /*INDIVIDUAL RVR -- MID POINT       */MAS02790
          3 RVRROLL    CHAR(1),  /*INDIVIDUAL RVR -- ROLL OUT        */MAS02800
          3 HIRL       CHAR(1),                                       MAS02810
          3 CL         CHAR(1),                                       MAS02820
          3 TDZ        CHAR(1),                                       MAS02830
          3 CEILMIN    CHAR(4),                                       MAS02840
          3 VISMIN     CHAR(6),                                       MAS02850
          3 RVRMIN     CHAR(4),                                       MAS02860
```

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          2 VOR          CHAR(1),                                          MAS02870
          2 MID_DME      CHAR(1),                                          MAS02880
          2 UPS(3)       CHAR(1),                                          MAS02890
          2 ENG(3)       CHAR(1),                                          MAS02900
          2 EQPMSG(60)   CHAR(79),                                         MAS02910
          2 MSG          CHAR(79);                                         MAS02920
/ /
                                                                           MAS02930
     DCL 1 TRIG  STATIC EXTERNAL,          /*PF9 -- TRIGGERS -- 7-03-86*/ MAS02940
          2 CRSS,                                                          MAS02950
            3 ARR        CHAR(2),                                        MAS02960
            3 DEP        CHAR(2),                                        MAS02970
          2 TAIL,                                                          MAS02980
            3 ARR        CHAR(2),                                        MAS02990
            3 DEP        CHAR(2),                                        MAS03000
          2 MSGTIME,                                                       MAS03010
            3 EQPOTS     CHAR(3),                                        MAS03020
            3 EQPRTS     CHAR(3),                                        MAS03030
            3 RWYOTS     CHAR(3),                                        MAS03040
            3 RWYRTS     CHAR(3),                                        MAS03050
            3 NOISE      CHAR(3),                                        MAS03060
            3 RMAINT     CHAR(3),                                        MAS03070
            3 STAFF      CHAR(3),                                        MAS03080
            3 DEMAND     CHAR(3),                                        MAS03090
            3 OTHER      CHAR(3),                                        MAS03100
          2 AT_VAL,                                                        MAS03110
            3 TOTDMD     CHAR(3),                                        MAS03120
            3 ARRDMD     CHAR(3),                                        MAS03130
            3 DEPDMD     CHAR(3),                                        MAS03140
            3 WIND,                 /*SCREEN PGM CONVERTS DIR TO 2 CHAR*/MAS03150
              4 DIR      CHAR(3),                                        MAS03160
              4 SPD      CHAR(2),                                        MAS03170
            3 CEIL       CHAR(5),                                        MAS03180
            3 RVR        CHAR(4),                                        MAS03190
          2 AT_FLG,               /*' '=NOT TRIGGERED & '*'=TRIGGERED*/  MAS03200
            3 TOTDMD     CHAR(1),                                        MAS03210
            3 ARRDMD     CHAR(1),                                        MAS03220
            3 DEPDMD     CHAR(1),                                        MAS03230
            3 WIND       CHAR(1),                                        MAS03240
            3 CEIL       CHAR(1),                                        MAS03250
            3 RVR        CHAR(1),                                        MAS03260
          2 CAB_VAL,              /*LIKE PARAM.AT_VAL*/                  MAS03270
            3 TOTDMD     CHAR(3),                                        MAS03280
            3 ARRDMD     CHAR(3),                                        MAS03290
            3 DEPDMD     CHAR(3),                                        MAS03300
            3 WIND,                 /*SCREEN PGM CONVERTS DIR TO 2 CHAR*/MAS03310
              4 DIR      CHAR(3),                                        MAS03320
              4 SPD      CHAR(2),                                        MAS03330
            3 CEIL       CHAR(5),                                        MAS03340
            3 RVR        CHAR(4),                                        MAS03350
          2 CAB_FLG,    /*LIKE PARAM.AT_FLG-- ' '=NOT TRIG & '*'= TRIG*/MAS03360
            3 TOTDMD     CHAR(1),                                        MAS03370
            3 ARRDMD     CHAR(1),                                        MAS03380
            3 DEPDMD     CHAR(1),                                        MAS03390
            3 WIND       CHAR(1),                                        MAS03400
```

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          3 CEIL      CHAR(1),                                          MAS03410
          3 RVR       CHAR(1),                                          MAS03420
        2 MSG         CHAR(79),                                         MAS03430
/ /
                                                                        MAS03440
    DCL 1 CFLOG STATIC EXTERNAL,    /*PF9 --CONFIG PLAN LOG -- 7-03-86*/MAS03450
        2 CONFIND(96) FIXED BIN(15),    /*CONFIG INDEX                 */MAS03460
        2 MSG         CHAR(79),                                         MAS03470
/ /
                                                                        MAS03486
    DCL 1 WXLOG STATIC EXTERNAL,    /*PF9 -- WX PLAN LOG -- 7-03-86    */MAS03490
        2 TABLE(16),                                                    MAS03500
          3 START     CHAR(4),      /*START TIME                       */MAS03510
          3 END       CHAR(4),      /*END TIME                         */MAS03520
          3 CEIL      CHAR(5),                                          MAS03530
          3 VIS       CHAR(6),                                          MAS03540
          3 DIR       CHAR(3),      /*SCREEN PGM CONVERTS IT TO 2 CHAR*/MAS03550
          3 VEL       CHAR(2),                                          MAS03560
          3 REMARKS   CHAR(25),                                         MAS03570
          3 USER      CHAR(3),                                          MAS03580
          3 ACCTIME   CHAR(4),                                          MAS03590
        2 MSG         CHAR(79);                                         MAS03600
/ /
                                                                        MAS03610
     DCL 1 CLSLOG STATIC EXTERNAL, /*PF9 -- RWY CLOSURE LOG -- 7-03 86*/MAS03620
         2 TABLE(16),                                                   MAS03630
           3 RWY      CHAR(3),                                         MAS03640
           3 ARR      CHAR(1),                                         MAS03650
           3 DEP      CHAR(1),                                         MAS03660
           3 CLSTIME  CHAR(4),                                         MAS03670
           3 OPNTIME  CHAR(4),                                         MAS03680
           3 SURF     CHAR(5),                                         MAS03690
           3 BRAK     CHAR(5),                                         MAS03700
           3 REMARKS  CHAR(9),                                         MAS03710
           3 USER     CHAR(3),                                         MAS03720
           3 ACCTIME  CHAR(4),                                         MAS03730
         2 MSG        CHAR(79),                                        MAS03740
/ /
                                                                        MAS03750
    DCL 1 EQPLOG STATIC EXTERNAL,  /*PF9 -- EQUIP PLAN LOG -- 7-03 86*/MAS03760
        2 TABLE(31),                                                    MAS03770
          3 RWY       CHAR(3),                                          MAS03780
          3 EQUIPMENT CHAR(4),                                          MAS03790
          3 OTS       CHAR(4),                                          MAS03800
          3 RTS       CHAR(4),                                          MAS03810
          3 REMARKS   CHAR(30),                                         MAS03820
          3 USER      CHAR(3),                                          MAS03830
          3 ACCTIME   CHAR(4),                                          MAS03840
        2 MSG         CHAR(79),                                         MAS03850
/ /
                                                                        PCS00010
    DCL 1 PCSTAT STATIC EXTERNAL,   /*PC EQUIP STATUS PANEL     7-09-86*/PCS00020
        2 RUNWAY(12),               /*                  -- SET BY PC USER*/PCS00030
          3 CATII     CHAR(1),  /*Y=IN SER,N=NOT AVAIL     =AVAILABLE*/PCS00040
          3 CATIII    CHAR(1),  /*Y=IN SER,N=NOT AVAIL     =AVAILABLE*/PCS00050
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          3 LOC          CHAR(8),                                          PCS00060
          3 GS           CHAR(7),                                          PCS00070
          3 LOM          CHAR(1),   /*LOM = COM + OM                     */PCS00080
          3 OM           CHAR(1),                                          PCS00090
          3 MM           CHAR(1),                                          PCS00100
          3 IM           CHAR(1),                                          PCS00110
          3 ALS          CHAR(1),                                          PCS00120
          3 FLASHER      CHAR(1),                                          PCS00130
          3 DME          CHAR(1),                                          PCS00140
          3 R_READ(3)    CHAR(6),   /*RVR READINGS -- TD, MID, ROLL       */PCS00150
          3 RVR          CHAR(1),   /*            TOUCHDOWN RVR           */PCS00160
          3 RVRMID       CHAR(1),   /*INDIVIDUAL RVR -- MID POINT         */PCS00170
          3 RVRROLL      CHAR(1),   /*INDIVIDUAL RVR -- ROLL OUT          */PCS00180
          3 MIRL         CHAR(1),                                          PCS00190
        2 MIDWAY,                                                          PCS00200
          3 FLG_ILS      CHAR(1),                                          PCS00210
          3 FLG_LOC      CHAR(1),                                          PCS00220
          3 FLG_NDB      CHAR(1),                                          PCS00230
          3 FLG_31L      CHAR(1),                                          PCS00240
          3 FLG_22L      CHAR(1),                                          PCS00250
          3 FLG_13R      CHAR(1),                                          PCS00260
          3 FLG_4R       CHAR(1),                                          PCS00270
        2 WIND,                                                            PCS00280
          3 DIR          CHAR(3),  /*SCREEN PGM CONVERTS TO 2 CHAR        */ PCS00290
          3 SPD          CHAR(2),                                          PCS00300
        2 GUST           CHAR(2),                                          PCS00310
        2 MID_DME        CHAR(1),                                          PCS00320
        2 VOR_4R         CHAR(1),                                          PCS00330
        2 DAS_ORD        CHAR(4),                                          PCS00340
        2 DAS_MID        CHAR(4),                                          PCS00350
        2 CAT_14R        CHAR(10), /*14R -- CAT II/III READINGS           */ PCS00360
        2 CAT_14L        CHAR(10), /*14L -- CAT II/III READINGS           */ PCS00370
        2 CEIL(2)        CHAR(8),  /*CEILOMETER -- AAANNNNN               */ PCS00380
        2 UPS(3)         CHAR(1),                                          PCS00390
        2 ENG(3)         CHAR(1),                                          PCS00400
        2 MSG            CHAR(79),                                         PCS00410
/ /
                                                                           MAS04240
    DCL 1 PLNSTAT STATIC EXTERNAL,          /*PLAN STATUS -- 7-03-86*/MAS04250
          2 RUNWAY(12),                     /*CLOSURE & EQP STATUS  */MAS04260
            3 ARR        CHAR(1),                                          MAS04270
            3 DEP        CHAR(1),                                          MAS04280
            3 LOC        CHAR(1),                                          MAS04290
            3 GS         CHAR(1),                                          MAS04300
            3 COM        CHAR(1),                                          MAS04310
            3 OM         CHAR(1),                                          MAS04320
            3 MM         CHAR(1),                                          MAS04330
            3 IM         CHAR(1),                                          MAS04340
            3 ALS        CHAR(1),                                          MAS04350
            3 FLASHER    CHAR(1),                                          MAS04360
            3 DME        CHAR(1),                                          MAS04370
            3 RVR        CHAR(1),                  /*  TOUCHDOWN RVR    */MAS04380
            3 RVRMID     CHAR(1)   /*INDIVIDUAL RVR -- MID POINT         */MAS04390
            3 RVRROLL    CHAR(1),  /*INDIVIDUAL RVR -  ROLL OUT          */MAS04400
            3 MIRL       CHAR(1),                                          MAS04410
```

```
          3 CL          CHAR(1),                                          MAS04420
          3 TBZ         CHAR(1);                                          MAS04430
/ /
                                                                          MAS04440
 DCL DAYLITE CHAR(3) STATIC EXTERNAL;/*DAYLITE SAVINGS TIME--YES,NO*/     MAS04450
/ /
                                                                          CNF00010
DCL 1 CNFGRP(62) STATIC EXTERNAL,     /*FAATC DEFINITION -- 7-14-86*/     CNF00020
       2 ID              BIT(24),     /* 12 ARR BITS & 12 DEP BITS */     CNF00030
       2 FLOW_INDX       FIXED BIN(15),  /* 1=A 2=AB 3=B 4=BC 5=C */      CNF00040
       2 FLOW            CHAR(2),        /* A, AB, B, BC, C       */      CNF00050
       2 ARR(4)          CHAR(3),                                         CNF00060
       2 DEP(4)          CHAR(3),                                         CNF00070
       2 VFR_CAP(3)      CHAR(3), /*VFR CAPACITY 1=TOT 2=ARR 3=DEP*/      CNF00080
       2 IFR_CAP(3)      CHAR(3); /*IFR CAPACITY 1=TOT 2=ARR 3=DEP*/      CNF00090
/ /
                                                                          ARE00010
 DCL 1 AREAWX  STATIC EXTERNAL, /*PF6A -- AREA WX PANEL -- 2-11-87*/       ARE00020
       2 DATA(21)    CHAR(79),                                            ARE00030
       2 MSG         CHAR(79);                                            ARE00040
/ /
```

END OF MASTER DATA BASE

APPENDIX B

APPLICATION OF SENSOR DATA TO RCMS LOGIC

RCMS LOGIC APPLICATION

CURRENT DATA

ALSF-2 (14R only)

ALSF/SSALR switch	System selection
Light switch	Switch on or off (OTS)
Flasher switch	Switch on or off (OTS)

ALSF-1 (14L only)

Light switch	Switch on or off (OTS)
Flasher switch	Switch on or off (OTS)

SALSR (27L, 32R, 32L)

SALSR switch	Switch on or off (OTS)
SFL switch	Switch on or off (OTS)

4L SALSR being replaced with
Lion Lighting System

MALSR (4R, 9R, 9L, 22R, 22L, 27R)

MALSR switch	Switch on or off (OTS)
Flasher switch on 4R, 9L, 22R, 27R only	Switch on or off (OTS)

9R & 22L follow brightness
22L will have flasher switch eventually

RCMS LOGIC APPLICATION

CURRENT DATA

LOC (all runways)	
Main	System on (primary channel)
Standby	System on (secondary channel)
Abnormal-off	No failure
steady	Failure
flashing (TI equipment)	Out-of-service for maintenance
Trans 1	Transmitter on or off (Both transmitters required for
Trans 2	CAT III operations)
Alarm	Failure
IM (14R & 14L only)	Switch on or off (OTS)
MM (all runways except 4L)	
14R, 14L, 27L, 32R are monitored	Switch on or off (OTS)
OM (all runways)	
14R & 14L are monitored	Switch on or off (OTS)
LOM/NDB (14R & 14L Monitored)	Switch on or off (OTS)

RCMS LOGIC APPLICATION

CURRENT DATA

GS (all runways except 4L)

Main	System on (primary channel)
Standby	System on (secondary channel)
Abnormal-off	No failure
steady	Failure
flashing (TI equipment)	
Out-of-service (OTS) for maintenance	
Trans 1	Switch on or off (OTS)
Trans 2	Switch on or off (OTS)

DME (9R, 14R, 14L, 32L, 27L)

Normal	Switch on or off (OTS)
	DME failure if associated localizer is on
DME Midfield (Wilcox model)	Switch on or off (OTS)
VOR	Switch on or off (OTS)

Manual Panel (14R & 14L)

CAT II and CAT III — after completing checklist, user may enter 'Y' into CAT II or CAT III for 14R or 14L

a. ILS	e. CAT II	i. ALS EG
b. RVR	f. CAT III	j. City EG
c. Other 14 up	g. City lights	
d. IM	h. Equipment EG	

RICU Unit (14R)

CAT II & CAT III	Light on or off indicates availability

Uninterrupted Power Sources

4R LOC, 4R GS (monitored), 9R GS	If off, then system has 15 minutes of operation

RCMS LOGIC APPLICATION

CURRENT DATA

DASE (Chicago O'Hare and Midway)

A1 - A7 B1 - B7	Numeric values for altimeter setting
A1 - A7 B1 - B7	Numeric values for altimeter setting Numeric values for altimeter setting

LLWAS (Centerfield Wind)

Wind direction	Numeric value - degrees displayed on PF-1
Wind velocity	Numeric value - knots displayed on PF-1
Gust value	Numeric value - knots

No crosswind advisory messages are generated if the wind is gusting.

Ceilometer (Two field units)

Cloud height conditions & ceiling (Scattered, broken, or overcast)	18 bits of data for the 2 ceilometers

RCMS LOGIC APPLICATION

CURRENT DATA

Midway Light Panel	
ILS	Not presently used
LOC	Not presently used
NBD	Not presently used
31L	Not presently used
22L	Not presently used
13R	If light is on, 13R operations affect departures on 22L & 27L
4R	Not presently used
Engine Generator	
Eng 1 (14R Engine)	Required for CAT II and CAT III
Eng 2 (14L Engine)	Required for CAT II and CAT III
Eng 3 (ASR-7 Engine)	Required for CAT II and CAT III
High Intensity Runway Lights (runway edge lights)	
9R, 9L, 14R, 14L, 27R, 27L, 32R, 32L	Switch on or off (OTS) depending on monitored by RVR the brightness level
4R, 4L, 22R, 22L are not monitored	
Touchdown RVR	
9R, 9L, 14R, 14L, 27R, 27L, 32R, 32L	Readings of RVR, HIRL, Daylight, and status bit
4R, 4L, 22R, 22L are not monitored	
Mid RVR	
14R and 14L	Readings of RVR, HIRL, Daylight, and status bit

APPENDIX C

FOREGROUND PROGRAM DOCUMENTATION

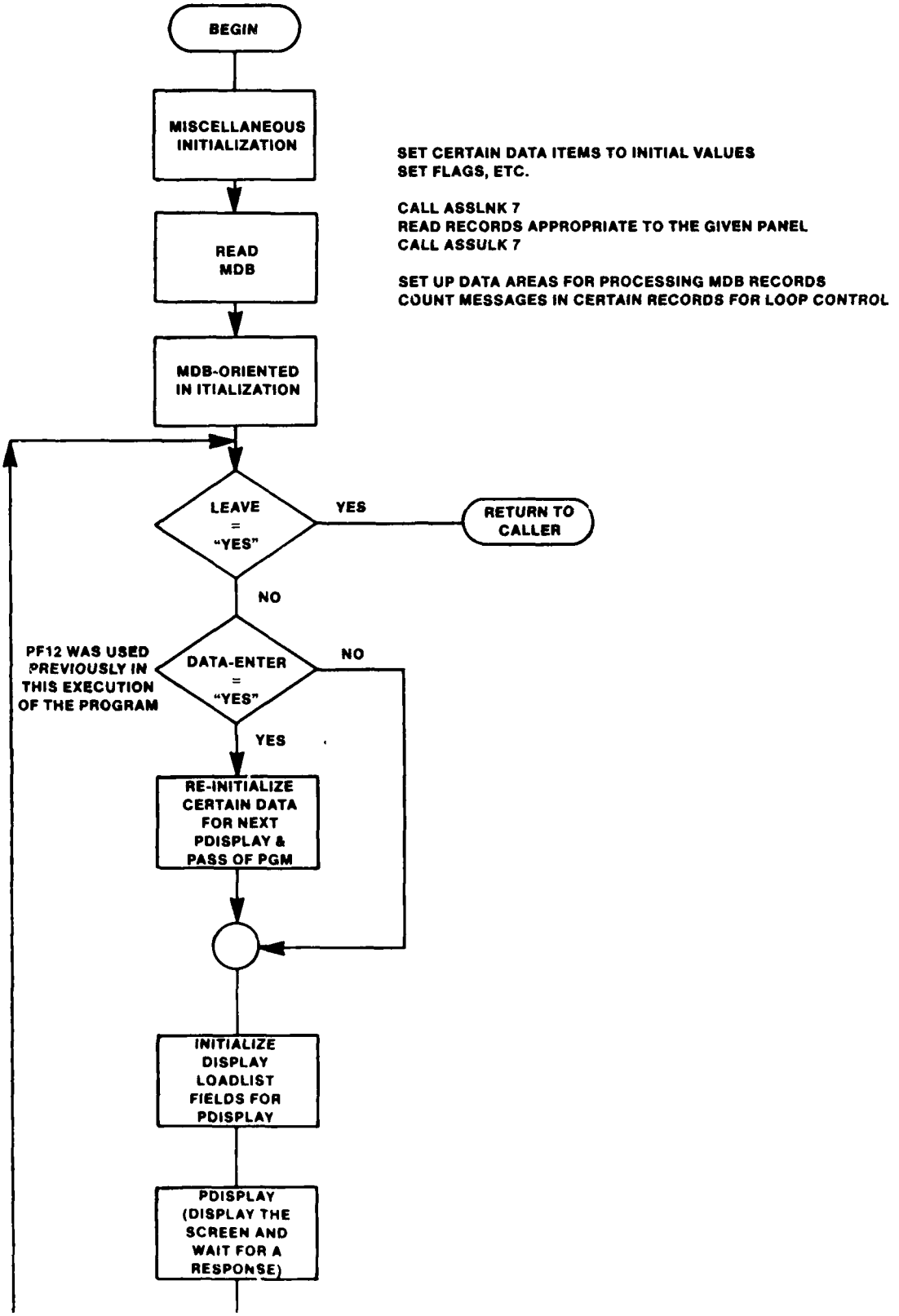
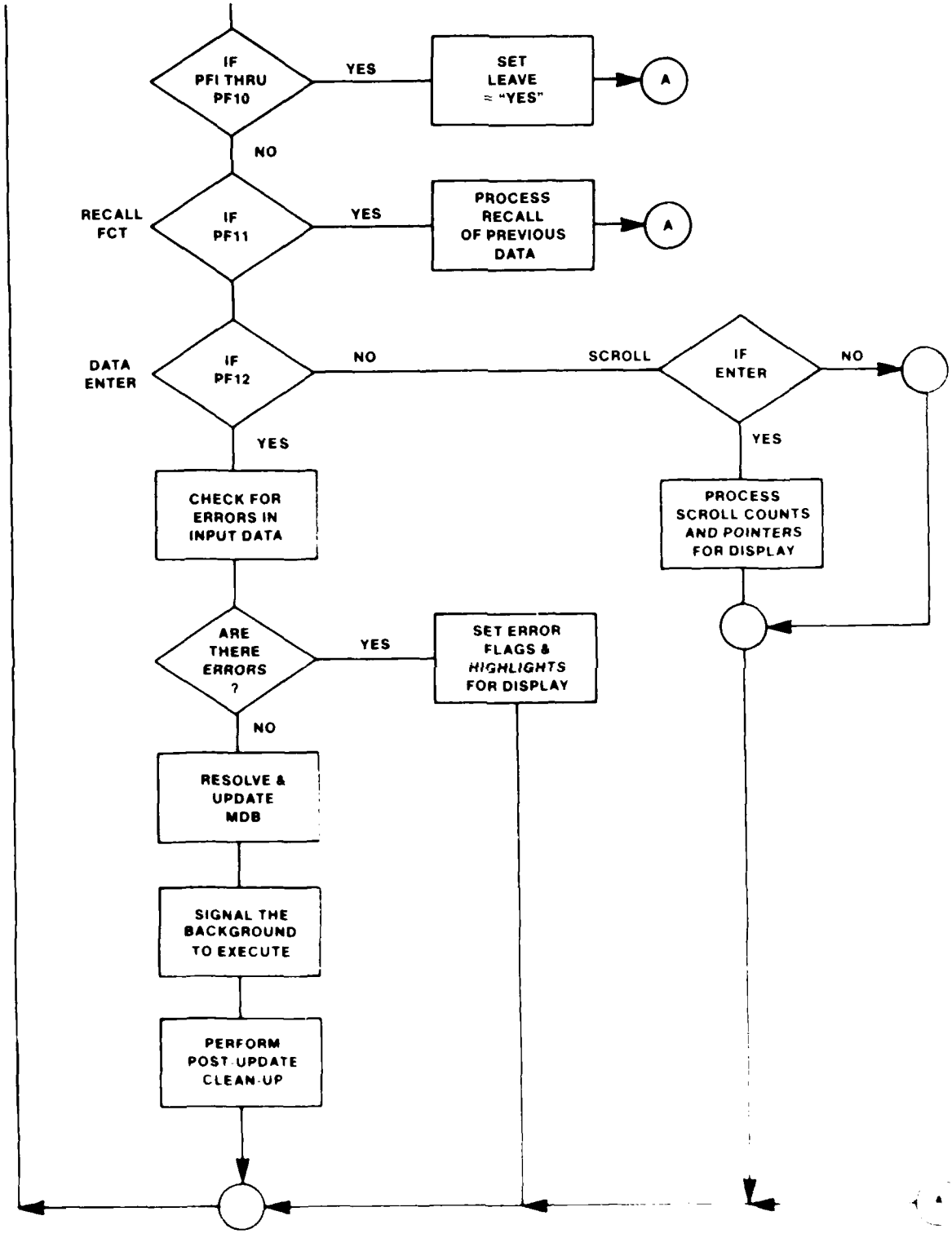


FIGURE C-1. GENERIC SCREEN PROGRAM FLOW CHART (1 of 2 Sheets)


IF PF1 THRU PF10
YES
SET LEAVE = "YES"
A
NO
RECALL FCT
IF PF11
YES
PROCESS RECALL OF PREVIOUS DATA
A
DATA ENTER
IF PF12
NO
SCROLL
IF ENTER
NO
YES
YES
CHECK FOR ERRORS IN INPUT DATA
PROCESS SCROLL COUNTS AND POINTERS FOR DISPLAY
ARE THERE ERRORS ?
YES
SET ERROR FLAGS & HIGHLIGHTS FOR DISPLAY
NO
RESOLVE & UPDATE MDB
SIGNAL THE BACKGROUND TO EXECUTE
PERFORM POST UPDATE CLEAN-UP

ASSEMBLER LANGUAGE PROGRAMS USED IN THE FOREGROUND USER PROGRAMS

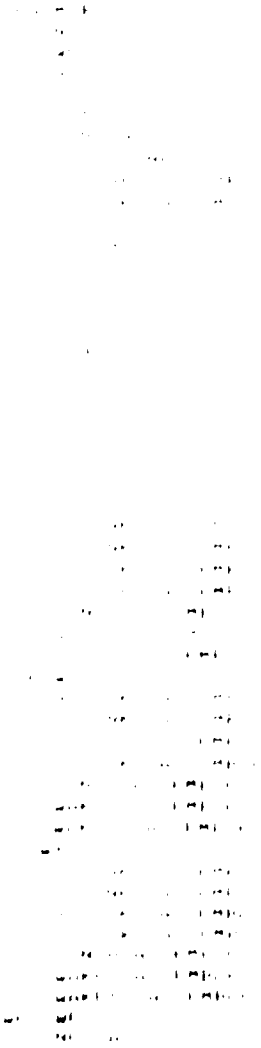
AREDCMS	TEST MASTDB DATA ON CMS7 TO SEE IF IT NEEDS TO BE REORGANIZED
ASMERSC	ERASE CITY DATA FILE IN USER CITY (ERASE CITY DATA D)
ASMERSF	ERASE OLD FORECAST WORK FILES IN CMS8 (FILE FWRK & FILE FCAST)
ASMERSR	ERASE OLD REORG FILE IN CMS7 - USED WHEN REORGANIZING MASTDB DATA
ASMFWRK	COPY FWRK DATA C TO ORDDATA DATA B (NOTE: THIS PGM OBSOLETE)
ASMRENF	EXECUTE RENF EXEC (RENAME FILE FCAST C FILE FWRK C)
ASMTWRK	MOVE R FWRK - USED IN FORECAST (NOTE: THIS PGM NEEDS MODIFICATION)
ASNRENA	EXECUTE NRENA EXEC - USED IN REORGANIZING MASTDB DATA
ASSLNK2	LINK TO CMS2 WRITE FULL SCREEN DATA (ACC 198 C)
ASSLNK7	LINK TO CMS7 MASTER DATA BASE (ACC 197 B)
ASSLNK8	LINK TO CMS8 FORECAST FILES (ACC 198 C)
ASSLNKC	LINK TO CITY USER (CMS15) (ACC 199 D)
ASSLNKS	LINK TO FORECAST FILES IN USER ERIC (CMS8) (ACC 197 B)
ASSLNKW	LINK TO CMS2 (WFS DATA) FOR THE WFS PGM (ACC 200 W)
ASSULK2	UNLINK - REL C & DET 198
ASSULK7	UNLINK - REL B & DET 197
ASSULK8	UNLINK - REL C & DET 198
ASSULKC	UNLINK - REL D & DET 199
ASSULKW	UNLINK - REL W & DET 200
ERROR	CALLED BY SCREEN PROCESSING PROGRAMS TO HANDLE ERRORS
SDMSG	SEND A SPECIAL MESSAGE TO CURRENT BACKGROUND TO WAKE IT UP
SDMSG8	SEND A SPECIAL MESSAGE TO FORECAST BACKGROUND TO WAKE IT U
SDMSGC	SEND A SPECIAL MESSAGE TO CURRENT BACKGROUND TO WAKE IT UP
WAKE3	ISSUE A WAKEUP COMMAND FOR 3 SECONDS (WAKEUP +00 03)
WAKE10	ISSUE A WAKEUP COMMAND FOR 10 SECONDS (WAKEUP +00 10)
XA	ERASE AND MAINTAIN THE MASTER AUTO PANEL (PF1)
XW	SCREEN TO ALLOW USER TO WRITE A MSG ANYWHERE ON THE SCREEN

[illegible]

[illegible] LANGUAGE PROGRAMS USED IN THE FOREGROUND USER PROGRAM

[illegible]	TEST THE SIZE OF THE MASTER DATA BASE [illegible]
	REORGANIZED.
[illegible]	UPDATE THE FILE CITY DATA WITH DATE [illegible]
TIME	UTILITY PROGRAM - CONVERT QUARTER HOUR [illegible]
TIME4	UTILITY PROGRAM - CONVERT TIME TO A FIXED [illegible]
[illegible]	INITIALIZATION AND MAINZ PROGRAM FOR THE [illegible]
[illegible]	FORECAST PANEL PROGRAM - STATUS PANEL
[illegible]	FORECAST PANEL PROGRAM - CONFIGURATION PANEL
[illegible]	FORECAST PANEL PROGRAM - DEMAND PANEL
[illegible]	FORECAST PANEL PROGRAM - WEATHER PLANNING PANEL
[illegible]	FORECAST PANEL PROGRAM - RUNWAY CONDITIONS PLANNING [illegible]
[illegible]	FORECAST PANEL PROGRAM - RUNWAY EQUIPMENT PLANNING PANEL
[illegible]	INITIALIZES ARRIVAL RUNWAY MINIMUMS STRUCTURE (RWYMIN)
MINIMA	CALCULATES ARRIVAL RUNWAY MINIMA FOR THE QUARTER HOUR
[illegible]	CREATE A FORECAST WORK FILE FROM THE MASTER DATA BASE
[illegible]	CURRENT MODE PANEL PROGRAM - MASTER PANEL
[illegible]	CURRENT MODE PANEL PROGRAM - CONFIGURATION PANEL
[illegible]	CURRENT MODE PANEL PROGRAM - MESSAGE PANEL
[illegible]	CURRENT MODE PANEL PROGRAM - DEMAND PANEL
[illegible]	CURRENT MODE PANEL PROGRAM - WEATHER PANEL
[illegible]	CURRENT MODE PANEL PROGRAM - RUNWAY CONDITIONS PANEL
[illegible]	CURRENT MODE PANEL PROGRAM - RUNWAY EQUIPMENT PANEL
[illegible]	CURRENT MODE PANEL PROGRAM - TRIGGER VALUES PANEL
[illegible]	CURRENT MODE PANEL PROGRAM - TAXIWAY/NOTAM PANEL FOR CITY
[illegible]	CURRENT MODE PANEL PROGRAM - PLANNING/FORECAST MODE ENTRY
[illegible]	READ ALL THE RECORDS IN THE MASTER DATA BASE
[illegible]	READ THE WRITE FULL SCREEN DATA FILE
[illegible]	REORGANIZE THE MASTER DATA BASE
[illegible]	RESOLVE THE MASTER DATA BASE
[illegible]	THIS IS THE MAIN 'LOOP' OF THE FOREGROUND USER PROGRAM. IT CALLS THE APPROPRIATE PANEL PROGRAM IN RESPONSE TO A USER'S REQUEST FOR A PANEL.
[illegible]	PROGRAM THAT SUBMITS A RUNWAY EQUIPMENT PLAN FROM THE FORECAST MODE TO THE CURRENT MODE.
[illegible]	PROGRAM THAT SUBMITS A RUNWAY CONDITIONS PLAN FROM THE FORECAST MODE TO THE CURRENT MODE.
[illegible]	PROGRAM THAT SUBMITS A WEATHER PLAN FROM THE FORECAST MODE TO THE CURRENT MODE.
[illegible]	WRITE A NEW WRITE FULL SCREEN DATA FILE (USED FOR UPDATING

```
                    A
    CALLING SEQUENCE OF THE
    PROGRAMS ARE LISTED SEQUENTIALLY
    ASSEMB
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
    ASSEMB
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
    TIME
        NO CALLS
    TIME4
        NO CALLS
    MERGAT
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
    ASSEMB
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
    ASSEMB
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
    ASSEMB
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
        ASSEMBLE
```

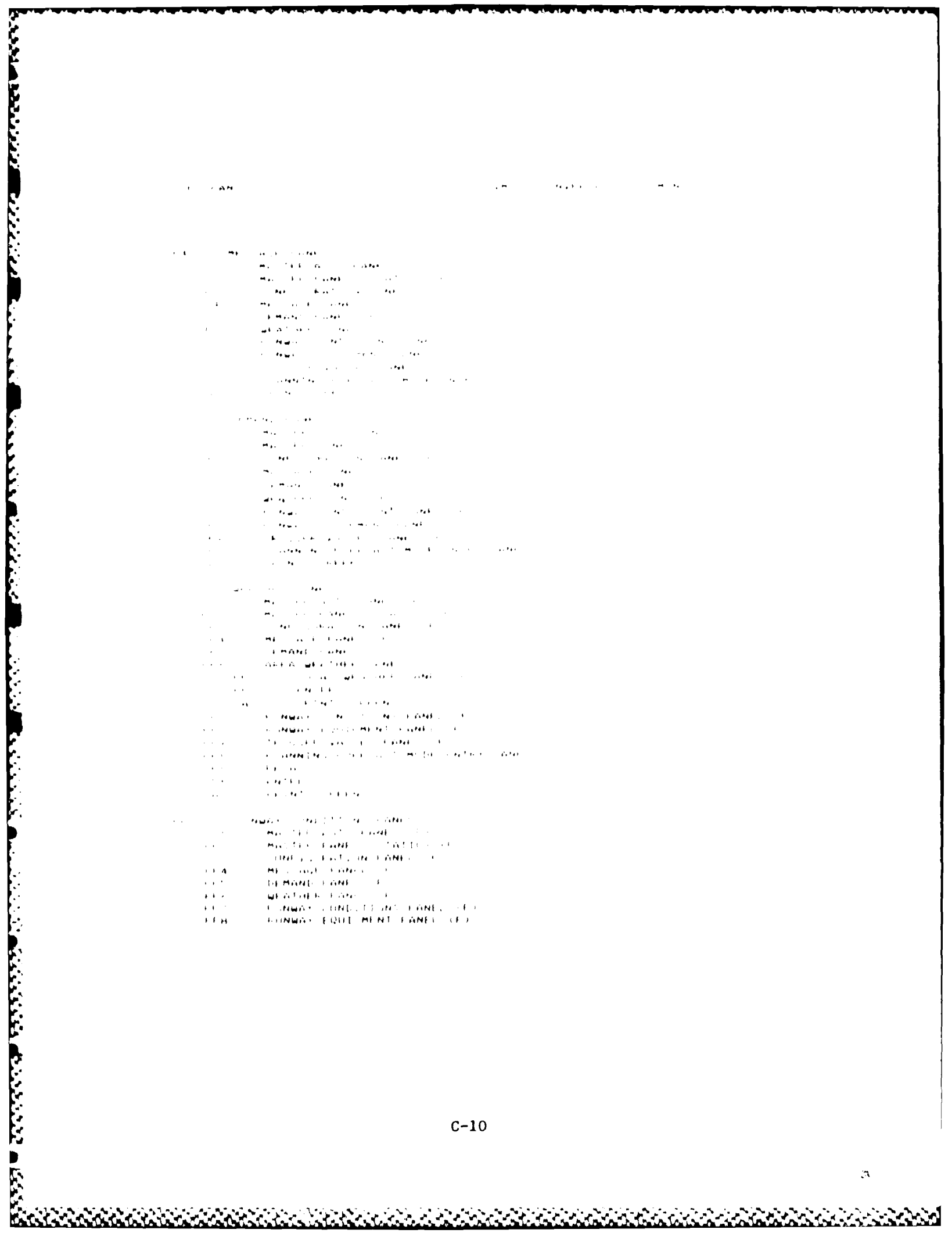


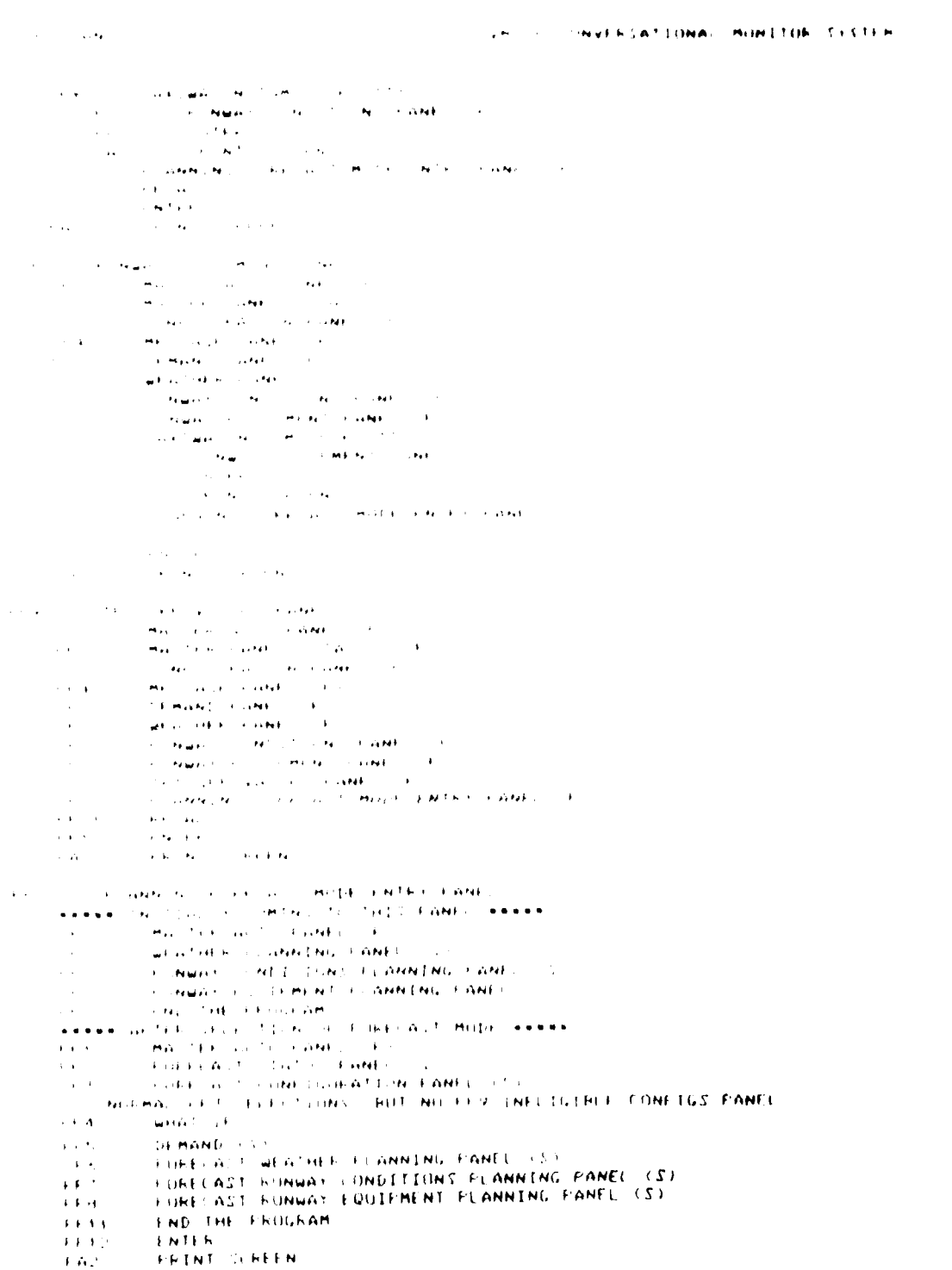
[illegible] CALLING STRUCTURE OF THE 'AT' FOREGROUND USER PROGRAM

```
[illegible]
    [illegible] ASSEMBLE
    [illegible] ASSEMBLE
    [illegible] ASSEMBLE
    [illegible] ASSEMBLE
    [illegible] ASSEMBLE
    READMDB PLI
        NO CALLS
    [illegible] PLI
        [illegible] ASSEMBLE
        ANRENA ASSEMBLE
            NRENA EXEC
        ASSLNK7 ASSEMBLE
        ASSULK7 ASSEMBLE
    GETMINS PLI
        NO CALLS
    [illegible] PLI
        CHECKR PLI
            AREDCMS ASSEMBLE
            ASSLNK7 ASSEMBLE
            ASSULK7 ASSEMBLE
            REORGR PLI
        [illegible] PLI
            ASSLNK2 ASSEMBLE
            ASSLNK7 ASSEMBLE
            ASSULK7 ASSEMBLE
            ASSULK2 ASSEMBLE
            ERROR ASSEMBLE
            PUNCH ASSEMBLE
            CTIME PLI
                NO CALLS
            CTIME4 PLI
                NO CALLS
            READWES PLI
                NO CALLS
            WRITWES PLI
                NO CALLS
        FF3AT PLI
            ASSLNK7 ASSEMBLE
            ASSULK7 ASSEMBLE
            ERROR ASSEMBLE
            PUNCH ASSEMBLE
            WAKE10 ASSEMBLE
            CTIME PLI
                NO CALLS
            CTIME4 PLI
                NO CALLS
        FF4AT PLI
            ASSLNK7 ASSEMBLE
            ASSULK7 ASSEMBLE
            ERROR ASSEMBLE
        FF5S PLI
            ASSLNK7 ASSEMBLE
            ASSULK7 ASSEMBLE
            ERROR ASSEMBLE
            SIGORD ASSEMBLE
            WAKE10 ASSEMBLE
    FF6AT PLI
        ASSLNK7 ASSEMBLE
        ASSULK7 ASSEMBLE
        ERROR ASSEMBLE
        SIGORD ASSEMBLE
        WAKE10 ASSEMBLE
    FF7S PLI
        ASSLNK7 ASSEMBLE
        ASSULK7 ASSEMBLE
        ERROR ASSEMBLE
        PUNCH ASSEMBLE
        RESL PLI
            NO CALLS
    FF8AT PLI
        ASSLNK7 ASSEMBLE
        ASSULK7 ASSEMBLE
        ERROR ASSEMBLE
        PUNCH ASSEMBLE
        MINIMA PLI
            NO CALLS
        FF9TAXI PLI
            ASSLNK7 ASSEMBLE
            ASSULK7 ASSEMBLE
            ERROR ASSEMBLE
            SIGORD ASSEMBLE
            CITYFIL PLI
                ASSLNK7 ASSEMBLE
                ASSLNKC ASSEMBLE
                ASSULK7 ASSEMBLE
                ASSULKC ASSEMBLE
                ASMERSC ASSEMBLE
            RESL PLI
                NO CALLS
    FF9AT PLI
        ASSLNK7 ASSEMBLE
        ASSULK7 ASSEMBLE
        ERROR ASSEMBLE
        SIGORD ASSEMBLE
    FF10S PLI
        ASMFWRK ASSEMBLE
        ASMTWRK ASSEMBLE
        ASSLNK7 ASSEMBLE
        ASSLNK8 ASSEMBLE
        ASSLNKS ASSEMBLE
        ASSULK2 ASSEMBLE
        ASSULK7 ASSEMBLE
        WFSMSG ASSEMBLE
        CTIME PLI
            NO CALLS
        CTIME4 PLI
            NO CALLS
```

```
MTORWRK FLI
     ASMBKSF ASSEMBLE
     ASMBRNF ASSEMBLE
          RENF EXEC
     ASSLNK7 ASSEMBLE
     ASSLNKB ASSEMBLE
     ASSULK2 ASSEMBLE
     ASSULK7 ASSEMBLE
     CTIME4 FLI
          NO CALLS
FFF. FLI
     ASSLNKB ASSEMBLE
     ASSULK2 ASSEMBLE
     FUNCHF ASSEMBLE
     WAKE10 ASSEMBLE
     CTIME FLI
          NO CALLS
     CTIME4 FLI
          NO CALLS
     MINIMA FLI
          NO CALLS
FFF3 FLI
     ASSLNK7 ASSEMBLE
     ASSLNKB ASSEMBLE
     ASSULK2 ASSEMBLE
     ASSULK7 ASSEMBLE
     ERROR ASSEMBLE
     FUNCHF ASSEMBLE
     WAKE10 ASSEMBLE
     CTIME FLI
          NO CALLS
     CTIME4 FLI
          NO CALLS
FFF5 FLI
     ASS NKB ASSEMBLE
     ASSULK2 ASSEMBLE
     ERROR ASSEMBLE
     FUNCH ASSEMBLE
FFF6 FLI
     ASSLNK7 ASSEMBLE
     ASSLNKB ASSEMBLE
     ASSULK2 ASSEMBLE
     ASSULK7 ASSEMBLE
     ERROR ASSEMBLE
     FUNCH ASSEMBLE
     FUNCHF ASSEMBLE
     WAKE3 ASSEMBLE
     WAKE10 ASSEMBLE
     CTIME4 FLI
          NO CALLS
FFF7 FLI
     ASSLNK7 ASSEMBLE
     ASSLNKB ASSEMBLE
     ASSULK2 ASSEMBLE
     ASSULK7 ASSEMBLE
     ERROR ASSEMBLE
     FUNCH ASSEMBLE
     FUNCHF ASSEMBLE
     WAKE3 ASSEMBLE
     WAKE10 ASSEMBLE
     CTIME4 FLI
          NO CALLS
FFF8 FLI
     ASSLNK7 ASSEMBLE
     ASSLNKB ASSEMBLE
     ASSULK2 ASSEMBLE
     ASSULK7 ASSEMBLE
     ERROR ASSEMBLE
     FUNCH ASSEMBLE
     FUNCHF ASSEMBLE
     WAKE3 ASSEMBLE
     CTIME4 FLI
          NO CALLS
SUBEQF FLI
     ASSLNK7 ASSEMBLE
     ASSLNKB ASSEMBLE
     ASSULK2 ASSEMBLE
     ASSULK7 ASSEMBLE
     FUNCH ASSEMBLE
     WAKE3 ASSEMBLE
     WAKE10 ASSEMBLE
SUBGWT FLI
     ASSLNK7 ASSEMBLE
     ASSLNKB ASSEMBLE
     ASSULK2 ASSEMBLE
     ASSULK7 ASSEMBLE
     FUNCH ASSEMBLE
     WAKE3 ASSEMBLE
     WAKE10 ASSEMBLE
SUBWT FLI
     ASSLNK7 ASSEMBLE
     ASSLNKB ASSEMBLE
     ASSULK2 ASSEMBLE
     ASSULK7 ASSEMBLE
     FUNCH ASSEMBLE
     WAKE3 ASSEMBLE
     WAKE10 ASSEMBLE
```

```
FILE  PANEL      DOC                                  VAX-11  CONVERSATIONAL MONITOR SYSTEM


    THIS FILE IS FOR THE FOREGROUND PANELS WHICH ARE NEVER BY MEANS OF
WAITING CERTAIN FUNCTION KEYS WHILE THE FOREGROUND PROGRAM IS RUNNING.

    THE PANELS ARE LISTED IN ORDER OF THEIR PRIMARY PANEL NAMES
BEGINNING IN COLUMN ONE.  THEN EACH PANEL WHICH CAN BE INVOKED FROM WITHIN
THE PRIMARY PANEL IS LISTED INDENTED TWO COLUMNS IN NEXT.  AFTER THE
ARE OTHER PRIMARY PANELS.  THESE WILL BE NOTED BY THE LETTER 'P' IN
PARENTHESES IN THE PRIMARY PANEL NUMBER FROM WHICH THEY MAY BE NOTED
BY THE KEY COMBINATION OTHER THAN A PRIMARY IN WHICH THEY WILL BE NOTED
WITH AN 'X' IN PARENTHESES.

PP       MASTER ACTIVITY PANEL
     PF1       MASTER ACTIVITY PANEL
     PF2       MASTER PANEL      (DATE)
     PF3        CONFIGURATION PANEL
     PF4       MESSAGE PANEL
     PF5       DEMAND PANEL
     PF6       WEATHER PANEL
     PF7       RUNWAY CONDITION PANEL
     PF8       RUNWAY EQUIPMENT PANEL
     PF9       TRIGGER VALUES PANEL
     PF10      PLANNING FORECAST MODE ENTRY PANEL
     PF11      CLEAR THE SCREEN AND RE-DISPLAY MASTER ACTIVITY PANEL

PP       MASTER PANEL      (DATE)
     PF1       MASTER ACTIVITY PANEL
     PF2       MASTER PANEL      (DATE)
     PF3        CONFIGURATION PANEL
     PF4       MESSAGE PANEL
     PF5       DEMAND PANEL
     PF6       WEATHER PANEL
     PF7       RUNWAY CONDITIONS PANEL
     PF8       RUNWAY EQUIPMENT PANEL
     PF9       TRIGGER VALUES PANEL
     PF10      PLANNING FORECAST MODE ENTRY PANEL
     PF11      CLEAR
     PA1       RESET
     PA2       PRINT SCREEN

PP       CONFIGURATION PANEL
     PF1       MASTER ACTIVITY PANEL (P)
     PF2       MASTER PANEL      (DATE)
     PF3       CONFIGURATION PANEL FOR NEXT QUARTER HOUR  OR TWO (X)
     PF4       MESSAGE PANEL
     PF5       DEMAND PANEL
     PF6       WEATHER PANEL
     PF7       RUNWAY CONDITIONS PANEL
     PF8       RUNWAY EQUIPMENT PANEL
     PF9       INELIGIBLE CONFIGURATIONS (X)
          PF1       RETURN TO PF3 CONFIGURATION PANEL
          PF2       ADVANCE TO INELIGIBLE CONFIGURATIONS FOR NEXT QUARTER HOUR
          PA2       PRINT SCREEN
     PF10      PLANNING FORECAST MODE ENTRY PANEL (P)
     PF11      RESET
     PF12      ENTER

          PA2       PRINT SCREEN
```




FORECAST RUNWAY EQUIPMENT PLANNING PANEL (S)
END THE PROGRAM
ENTER
PRINT SCREEN

APPENDIX D

GLOSSARY

ALS	APPROACH LIGHTING SYSTEM
ALSF	APPROACH LIGHTING SYSTEM WITH FLASHERS
CL	CENTERLINE LIGHTING
DASE	DIGITAL ALTIMETER SYSTEM
DME	DISTANCE MEASURING EQUIPMENT
EG	ENGINE GENERATOR
F	FLASHERS
FFM	FAR FIELD MONITOR
GS	GLIDE SLOPE
HHMM	HOUR-HOUR-MINUTE-MINUTE
HIRL	HIGH INTENSITY RUNWAY LIGHTS (RUNWAY EDGE LIGHTS)
IM	INNER MARKER
LLWAS	LOW LEVEL WIND SHEAR ALERT SYSTEM
LOC	LOCALIZER
LOM	COMPASS LOCATOR AT THE OUTER MARKER
MALSR	MEDIUM INTENSITY APPROACH LIGHTING SYSTEM WITH RAIL (FLASHERS)
MM	MIDDLE MARKER
NDB	NONDIRECTIONAL RADIO BEACON
OM	OUTER MARKER
OTS	OUT-OF-SERVICE
RAIL	RUNWAY ALIGNMENT INDICATOR LIGHTS
RTS	RETURN-TO-SERVICE
RVR	RUNWAY VISUAL RANGE
RWY	RUNWAY
SFL	SEQUENCE FLASHING LIGHTS
SSALR	SIMPLIFIED SHORT APPROACH LIGHTING SYSTEM WITH RAIL (FLASHERS)
TDZ	TOUCHDOWN ZONE LIGHTS
VOR	VERY HIGH FREQUENCY OMNI-RANGE

COMPASS LOCATORS ARE LOM/NDB

APPENDIX E

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END

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DTIC